



C-0 Outfitting
WBS 3.0
BTeV Project
Title I Design Report
December 2004



Fermilab



Fermi National Accelerator Laboratory
A Department of Energy National Laboratory
Managed by Universities Research Association

FESS/Engineering Project No. 6-8-3
Rev. 0

This Title I Design Report (CDR) is intended to be a self-consistent basis for a project baseline cost estimate. The current level of contingency is believed to be consistent with the degree of technical confidence in the design at this stage. It is recognized that some basic construction concerns will be reviewed and optimized during the remaining stages of the project.

SECTION I	EXECUTIVE SUMMARY
SECTION II	DETAILED DESCRIPTION
SECTION III	PERFORMANCE REQUIREMENTS
SECTION IV	REQUIREMENTS AND ASSESSMENTS
PART 1	Safeguards and Security
PART 2	Energy Conservation
PART 3	Health and Safety
PART 4	Environmental Protection
PART 5	Decontamination and Decommissioning
PART 6	Quality Assurance
PART 7	Maintenance and Operation
PART 8	Telecommunications
PART 9	Computer Equipment
PART 10	Handicapped Provisions
PART 11	Emergency Shelter Provisions
SECTION V	SUB-PROJECT ORGANIZATION AND EXECUTION PLAN
SECTION VI	RESOURCE REQUIREMENTS
SECTION VII	SUB-PROJECT OPERATIONAL PLAN
SECTION VIII	PROJECT CONTROLS
SECTION IX	DESIGN AND CONSTRUCTION PRINCIPALS
SECTION X	APPLICABLE CODES, STANDARDS AND QUALITY LEVELS; BUILDING CODE EXAMINATION
SECTION XI	COST ESTIMATE DETAIL
SECTION XII	WBS DEFINITIONS / BASIS OF ESTIMATE
SECTION XII	I SCHEDULE DETAILS

TABLE OF CONTENTS**C-0 Outfitting****Contents****SECTION XIV CONCEPTUAL DRAWINGS****SECTION XV OUTLINE SPECIFICATIONS****APPENDIX**

Integrated Project Team Responsibility Matrix
WBS 1.10, 2.0 and 3.0 WORK SCOPE INTERFACE MOU
Fermilab Environmental Evaluation Form
LEED Project Checklist
Procurement Schedule
Whitestone Building and Repair Cost Reference Information
Stakeholder Input from Comment and Compliance Review

REFERENCE DOCUMENTS

Fermilab Engineering Standards Manual
Applicable Directives and Work Smart
Integrated Project Team Responsibility Matrix
DOE Directive 430.1-1 Chapter 6
DOE Directive 430.1-1 Chapter 10
Escalation Rate Assumptions For DOE Projects
DOE Directive 430.1-1 Chapter 11
DOE Directive 430.1-1 Chapter 25
Multi-Organization Construction Site Safety Walkthrough
Procedure

EXECUTIVE SUMMARY

C-0 Outfitting

Section I

This section of the Title I Design Report (T1) defines the scope, cost and schedule for WBS 3.0, C-0 Outfitting portion of the BTeV project. The BTeV experiment will reside in the C-0 Building located at the C-0 station of the Tevatron Accelerator. This sub-project provides the required services and space configuration required to support the BTeV experiment. In addition this subproject provides for the building modification and electrical upgrades to the B-4, C-0 and C-1 Main Ring Service Buildings that are required to support the Interaction Region (IR) components.

Three main construction work packages are anticipated:

C-0 Outfitting Phase 1, installs the mezzanine structures, concrete masonry walls, fire protection, fire detection and electrical services needed to construct and test the analysis magnet and torroids in the Assembly area.

C-0 Outfitting Phase 2, installs the heating ventilation air conditioning (HVAC), process piping systems, and power required to support the BTeV detector electronics.

C-0 Sector High Voltage Power upgrade installs the 13.8 kv power required for full operation of the C-0 Building and for the IR at C-0.

PROJECT COSTS

The Total Estimated Cost (TEC) for WBS 3.0, C-0 Outfitting, is estimated to be \$7,080,547, without escalation. The Total Project Cost (TPC) for WBS 3.0 is estimated to be \$7,138,531, without escalation.

Activity ID	Activity Description	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
CONSTRUCTION							
		\$4,901,295	\$992,279	\$5,893,574	\$186,858	\$1,058,098	\$7,138,531
1 -- C-0 Outfitting Phase 1							
		\$1,737,180	\$276,404	\$2,013,585	\$55,280	\$345,599	\$2,414,465
2 -- C-0 Outfitting Phase 2							
		\$1,938,368	\$444,071	\$2,382,439	\$88,814	\$467,581	\$2,938,835
3 -- C Sector High Voltage Power Upgrade							
		\$600,409	\$175,470	\$775,880	\$35,094	\$119,849	\$930,824
4 -- Pre Procured Items							
		\$625,337	\$38,347	\$663,684	\$7,669	\$125,067	\$796,421
5 -- CDR, ACDR, & Project Reviews							
		\$0	\$57,984	\$57,984	\$0	\$0	\$57,984

EXECUTIVE SUMMARY

C-0 Outfitting

Section I

The TEC includes Construction, EDIA (Engineering, Design, Inspection and Administration). Management Reserve and Indirect Costs, although included in the above dollars, will be held in Project Management. The TEC have been estimated in FY05 dollars. No escalation has been included.

The TPC includes the TEC plus an estimated cost for FY 05 cost to support the project prior to CD-2, 3a approval.

Section VI, Cost Estimate Detail, of this document contains breakdown of the TEC for WBS 3.0 C-0 Outfitting. Additional details can be found in the Open Plan file.

SCHEDULE

Section VII, Schedule Details includes a print out of the Open Plan detailed bar chart for WBS 3.0 C-0 Outfitting. Additional schedule information can be found in the Open Plan file. The following is a list of the major baseline milestones included in WBS 3.0.

Activity		
ID	Activity Description	Early Finish
7.1	T5M: MS-1 Start Engineering	04Jan05
7.2	T4M: MS-2 Start Construction	06Apr05
7.3	T5M: MS-3 Side Bay. Struct. Complete	08Sep05
7.4	T5M: MS-4 Temo Power Operational (Fdr 45)	26Apr06
	T4M: MS-5 Beneficial occupancy of lower level	
7.5	and upper staging area	22Mar06
7.6	T5M: MS-6 Collision Hall Complete	26Mar07
	T5M: MS-7 Mechanical Systems Complete	
7.7	(Except CH)	29May07
7.8	T5M: MS-8 Electrical Systems Complete	06Jul07
	T4M: MS-9 Assembly, Service Building	
7.9	Construction Complete	06Jul07
7.10	T5M: MS-10 Engineering Complete	11Sep07

DETAILED DESCRIPTION

C-0 Outfitting

Section II

Existing Conditions

C-0 Test Area

In 1998 Fermilab constructed the C-0 Test Area at the C-0 straight of the Tevatron Accelerator. The layout for the C-0 Collision Hall Area is similar to the D-0 colliding beam facility. The current C-0 Building is a weather tight building shell with overall dimensions of 78' x 60' wide x 26' above grade. An 80' long x 30' wide x 22'-6" high Collision Hall lies on the Tevatron Beam line. An equipment by-pass extends around the Collision Hall at El. 722'-6 to provide continuity of the service aisle that is adjacent to the Tevatron beam line components. The Tevatron Enclosure approaches to the Collision Hall were constructed wider than the standard Main Ring enclosure with a depressed floor at El: 720'-0 to accept the Low Beta components. The Collision Hall, By-Pass and approach enclosures were constructed with the lighting, electrical services, cable trays and process piping to support the Tevatron Beam line components. The Collision Hall also included sprinkler piping to be connected to the ICW system included in the current C-0 Outfitting Phase 1 Work package.

The Collision Hall is connected to the Assembly Area via a movable shield door and personnel labyrinth. The central region under crane coverage is 33' wide x 50' long with alcoves of varying depth along the south and east perimeter. The Assembly Area and adjacent Receiving Area have been constructed with an overhead 30-ton crane, high bay lighting, spot smoke detection and fire suppression piping. A side bay 25' wide x 75' long has been construction with the columns designed to support two additional mezzanine floor decks. Stairs, elevators, electrical and mechanical rooms were considered in the original design.

C-0 Service Building

The C-0 Service Building is located on the inside of the Tevatron berm. A portion of the building is used to house a compressor for the Tevatron cryogenics. The B-4, C-1, and C-0 Service Buildings contained power supplies for the Main Ring. With the construction of the Main Injector these power supplies are no longer required and allow for the space to be reused for supplies that are required for the IR. See the detailed descriptions provided in WBS 2.0 Interaction Region Advanced Conceptual Design.

Proposed

Site work

The C-0 Outfitting site work involves upgrades of the existing C-0 Building constructed in 1998 and will install the power and mechanical services required

DETAILED DESCRIPTION

C-0 Outfitting

Section II

to support the BTeV project. Upgrades to the site area includes the construction of building footings and slab-on-grade for the stair #2 bay, mechanical equipment, Dewar support pads, a shed type building for gas bottles, underground utility work for and a new 13.8 KV feeder duct bank from the existing manhole at the B-4 Service Building to a new transformer pad at the C-0 Building. The transformer pad will contain three new 1500 KVA transformers, 13.8 kV switchgear and a 250 KVA Diesel Generator. Included in the site work will be the construction of a new heated bus duct enclosure from the C-0 Service Building to existing penetrations leading to the Tevatron Enclosure. Also included are the installation of a new 1500 KVA transformer at the C-0 Service building and new 500 KVA transformers at service buildings B-4 and C-1.

Architectural

The architectural build out portion of this project consists primarily of the installation of walls, doors, finishes, stairs, elevator, and raised computer flooring. Once the concrete floors have been installed to provide new floor levels at elevations 755'-4" and 764'-2", concrete block walls will be constructed between the high bay area and each of the newly installed floor sections on the north side of the building. Each of the 3 floors will have windows installed between the newly occupied space and the existing high bay. These windows will allow in daylight from the existing high bay skylights to enter the new areas, thereby enhancing the quality of the spaces, and allowing occupants to view the activities below.

Concrete block walls and hollow metal doors will be installed to enclose the equipment room, the elevator shaft, the stairway, the toilet rooms and janitor closets, as well as the mechanical and equipment rooms at elevations 731'-4" and 715'-0". An elevator will be installed in the existing previously planned shaft space. The elevator will be a 5,000-pound capacity "hospital" type elevator with openings on either end as required to accommodate the floor plan, with a total of 5 stops. Slight modifications will be made to the roof above the elevator shaft, raising it to a height that will provide the required head clearance for the elevator access to the third floor. An enclosed stair will be construction on the north side of the building, to provide the code required second means of egress for the first, second and third floors. The stair will be constructed within a 25' x 25' three story appendage to the existing building. The construction will consist of steel framing with siding and roofing to match the existing building. Current stairways provide the required exits from below grade spaces.

The entrance level (first floor) of the building (elev 746'-6") will have a raised computer floor system installed over the already constructed depressed floor. Also

DETAILED DESCRIPTION**C-0 Outfitting****Section
II**

constructed on this floor will be the interior stairs, the stair enclosure and the wall for the electrical equipment room and elevator enclosure, as well as the wall separating this floor from the high bay. Similar to the first floor, the second floor of the building (elev 755'-4") will see the construction of the interior stairs, the stair enclosure walls, and the wall closing off this floor from the high bay. In addition, this floor will house the men and women's toilet rooms, the janitor closet and a small kitchenette to service the building occupants. The third floor (elev 766'-0") will have a raised computer floor system installed over much of the newly installed concrete floor construction. Constructed on this floor will be the interior stairs, the stair enclosure wall, the elevator enclosure walls, and the wall separating this floor from the high bay. The space at the additional bay constructed off the northwest corner of the existing building will contain space for tech/computer workspace.

Finishes

The wall finishes will consist of painted or glazed concrete block for the new block walls. The ceiling finish will consist of the exposed underside of the concrete deck, painted with a textured, acoustical material to improve the acoustical qualities of the room. The interior liner panel of the exterior siding will provide wall finishes along the exterior walls. The second floor will have carpeting. The first and third floor computer rooms will have stringer type computer flooring. The computer floors will be isolated to building ground and have a separate under floor ground grid tied to the primary transformer-grounding loop. The toilet rooms, janitor closet and kitchenette will have ceramic tile floors. All other areas (corridors, stairs, mechanical and equipment rooms) will have sealed exposed concrete floors.

Structural

The new floor levels at elevations 755'-4" and 764'-2" will be eight-inch thick post tensioned, prestressed concrete floor slabs that have been selected to provide a minimum floor thickness. The slab will simply span between steel beams framed into new or existing steel columns.

Conventional Mechanical (HVAC)

The 3rd floor will be outfitted with 4 (CRAC) Computer Room Air Handler to handle approximately 305 heat load from 42 computer racks with heat density of 6 to 8 KW per rack plus 6 racks of 3 KW per rack. Each CRAC will be discharging approximately 52 to 56 F supply air into a common under floor supply plenum. There will be no spare or backup CRAC unit. Each unit will have leak detection sensor. All unit and leak sensors will tie in to a central monitoring panel. The CRAC humidifier system will be plumbed to domestic water to maintain the

DETAILED DESCRIPTION

C-0 Outfitting

Section
II

45% +/- 5 RH at all times. Each CRAC will have corresponding outdoor air-cooled condenser with R22 refrigerant. The raised floor air distribution system plenum height is tentatively set at 1'-10", and may be optimized during design stage. The layout of the racks will utilize the "hot-aisle cold-aisle" concept commonly used in present day high-density data center. Due to lack of ceiling height, there will be no common return plenum. The placement of this equipment in relation to the CRAC is very critical in ensuring optimum air distribution therefore the floor layout may be finalized during design stage. The space condition is at 72 F dry bulb and 45%RH, and designed with no occupant heat load during standard operation. The space to be occupied by the underfloor cabling is not yet defined but based on preliminary information it is noted that it will occupy minimal space and is assumed to be no more than 20% of the underfloor space. The air supply floor grille will be selected to have higher throw, more free area and less pressure drop to optimize the air distribution.

The 2nd floor office area will be served by a dedicated air-handling unit (AHU) with chilled water coil and electric heating coil. The unit will be located in the mechanical room. Air from AHU (estimated at 5 ton) will be distributed to this area via an insulated ductwork system to be routed to the office area through the pipe/duct chase. This unit will utilize an economizer cycle to cool the space when outdoor air temperatures are appropriate. Minimum outdoor air for 25 persons will be included in the air handling unit design. The space condition is for a typical office space (75 F & 50%RH for cooling, and 68F for heating).

The 1st floor computer area (~132KW or 38 Ton) will be served by a closed loop 55F "electronic cooling water system" (ECW). Except for the ECW header inside the room and the chilled water service to the heat exchanger, the rest of the ECW system, which includes plate heat exchanger, pumps, strainer, UV system, and controls is currently not part of this WBS 3.0, C-0 Outfitting scope. System piping shall be insulated copper. A supplemental computer air handler will serve this floor.

The Collision Hall will be served by a dedicated air-handler (estimated at 20 Ton or 8,000 cfm). This air-handler includes chilled water coil, heating coil, and humidifier system to meet the space requirements. There will be two modes of operation, HVAC-normal mode and ODH-purge mode. The cfm requirement for ODH-purge mode is 5,000 cfm. There will be a combination purge fan / return fan that will handle air from the collision hall. The heater coil will be sized to keep supply air above freezing to preclude bursting of the inside piping during ODH mode condition during winter. Redundant HVAC and fan are NOT required, however fans and heaters, required for ODH purge operation will be connected to

DETAILED DESCRIPTION**C-0 Outfitting****Section
II**

the generator. The collision hall requires space temperature of 60F to 80F at 40%RH to 50% relative humidity, except during purge mode. The unit will maintain air dewpoint to 53F, except during purge mode. The Collision Hall space requires a continuous constant make up air for inert gas purges, of no less than 50 cfm. Make up air requirement based on ASHRAE will also be included. This will be served by a dedicated outdoor make up air. The ODH airflow requirement is 5000 cfm.

The Assembly Hall will be served by a dedicated air handler (estimated at 20-Ton/8,000 cfm) with chilled water coil, and heating coil system to meet the space requirements. There will be two modes of operation, HVAC-normal mode and ODH-purge mode. Where applicable, the unit will utilize an economizer cycle to provide free cooling when outdoor air temperature is appropriate. There will be a combination purge fan / return fan that will handle air from the assembly hall. The heater coil will be sized to keep supply air above freezing preclude bursting the inside piping during ODH mode condition during winter. Redundant HVAC and fan, and backup power to this unit are NOT required. The Collision Hall requires space temperature of 60F to 80F at 40%RH to 50% relative humidity, except during purge mode. The Assembly Hall space requires a continuous constant make up air for inert gas purges, of no less than 50 cfm. Make up air requirement based on ASHRAE will also be included. This will be served by a dedicated outdoor make up air unit. The ODH airflow requirement is 5000 cfm.

There will be one outdoor air-cooled water chiller (no backup), preliminary estimate at 120 ton each, which will provide 45 F glycol-chilled water to the air handlers, make-up air unit and the heat exchanger.

The air handlers, make up air unit, chiller and pump in the mechanical room will be outfitted and will be integrated with site DDC controls Building automation system. The building HVAC system will be provided with basic controls and monitoring using DDC (Direct Digital Control) compatible with site wide BAS. The chiller and chilled water loop will be provided with taps and minimum flow, temperature and flow sensors for monitoring purposes and alarm and for future connection to experiments slow process controls. The chiller and pumps are self-controlled and will be started and switch manually. The chiller will have multiple compressors and built in staging controls. Chilled water pump shall be manually started and switched. The 3rd floor High-density computer rack cooling system will be monitored only using Metasys DDC. The Assembly Hall and Collision Hall air system, and ODH purge system will be provided with basic HVAC control compatible with site wide BAS. Additional sensors and industrial type controls that may be required specific to the experiments will be design and

DETAILED DESCRIPTION

C-0 Outfitting

Section II

selected by the experimenter/user and commissioning will be coordinated as required. Other sensors and controls as mandated by Ashrae 90, where applicable to the building system, will be provided

Electrical Room and elevator shaft will not require any HVAC.

Applicable requirement from ASHRAE 90.1 (such as economizer, CO2 sensors, ventilation controls) will be incorporated.

Heating. Air handler will be provided with electric heating coil. The high bay will make use of the existing electric space heater.

Building plumbing.

Condensate drains to be provided for the 1st floor and 3rd floor-cooling unit. The mechanical floor will be rework to include floor drains. Building plumbing to be sized and design in accordance with Illinois Plumbing Code.

Fire Protection / Fire Detection

The fire protection systems will comply with the criteria set forth in the National Fire Protection Association pamphlets and National Building Code. In particular, the pamphlets referenced are as follows:

- NFPA 10 – Standard for Portable Fire Extinguishers
- NFPA 13 – Standard for the Installation of Sprinkler Systems
- NFPA 15 – Standard for Water Spray Fixed Systems for Fire Protection
- NFPA 70 – National Electrical Code
- NFPA 72 – National Fire Alarm Code
- NFPA 90A - Standard for the Installation of Air-Conditioning & Ventilating
- NFPA 2001 - Standard on Clean Agent Fire Extinguishing Systems

Currently the existing C-0 Collision Hall has a complete addressable fire alarm system monitoring the entire facility and can be extended to monitor the new fire alarm points. In addition, an existing FIRUS system is installed which signal any fire alarm to our on-site Communications Center, so that emergency personnel can be dispatched.

A description of the fire protection system is as follows:

Collision Hall

Provide a pre-action fire sprinkler system connected to the existing piping network. This system will be designed to provide a minimum of 0.20 gpm per square foot over the most remote 1,950 square feet of sprinkler operation. The pre-action valve

DETAILED DESCRIPTION

C-0 Outfitting

Section II

will introduce water into the piping network upon loss of air and smoke from an air sampling smoke detection system.

Assembly Hall

Connect with a new sprinkler riser to the existing overhead wet-type fire sprinkler system. This system is designed to provide a minimum of 0.20 gpm per square foot over the most remote 1,500 square feet of sprinkler operation.

Mechanical Rooms

Provide a new wet-type fire sprinkler system utilizing quick response sprinklers, designed to a minimum of 0.15 gpm per square foot over the most remote 950 square feet of sprinkler operation.

Computer/Mezzanine Levels

Provide a new wet-type fire sprinkler system utilizing quick response sprinklers, designed to a minimum of 0.15 gpm square foot over the most remote 950 square feet of sprinkler operation. In addition, a clean agent fire extinguishing system activated by high velocity smoke detection, will be protected the raised computer floors and monitored by an auxiliary releasing fire alarm control panel.

Gas Shed

Provide (IF NECESSARY) a fixed water spray system protecting the gaseous tanks.

Electrical

The primary power transformers will be fed from a new 13.8kv feeder routed through spare ducts in the Main Ring duct bank to a breaker at the Kautz Road Substation (KRS). In addition, feeder 45 will be routed to the primary transformers from an open bay at the B-4 Service Building air switch. Feeder 45 will allow approximately 2 megawatts of available power prior to the installation of the new dedicated feeder for equipment power testing and building house power and allow for feeder maintenance of the new feeder. Both feeders will terminate at an air switch located on the primary transformer pad. A Kirk key system will be provided. One 1500 KVA transformer is dedicated to the detector's magnet and other equipment operated by power supplies. One 1500 KVA transformer will supply quiet power for electronics and computers. A 1500KVA transformer will supply house power. Critical safety systems will be on a 250 KVA generator with automatic transfer switch. User power will terminate at disconnect switches or circuited panel boards in computer rooms. Because of the structural systems planned and the existing constraints, all conduits will be surface mounted.

DETAILED DESCRIPTION

C-0 Outfitting

C-0 Service Building Upgrade

The C-0 Service Building Upgrade provides for the architectural and HVAC modifications and electrical power additions to support the Low Beta System at C-0. The existing service building consists of office space, shops and data rooms. The current office/tech space will accommodate new power supplies for the Low Beta System. HVAC modifications include the addition of exhaust fans and exterior wall louvers to cool the power supply room. A new 1500KVA transformer will be installed outside the C-0 Service Building to support the Low Beta System. The transformer will be connected to the power supplies by underground duct bank through the exterior wall of the service building. The transformer shall be fed from the existing pulse power feeder 23 located in the Main Ring Road duct bank. A new 2000Amp switchboard will be installed. Also fed from feeder 23 are new 500 KVA transformers at Service Buildings B-4 and C-1 that will feed 1200 AMP switchboards. Air switches will be installed to transition from 750 MCM to 350 MCM cable. Other than the power upgrades at B-4 and C-1, no other work in the buildings is anticipated as part of WBS 3.0.

Section II

PERFORMANCE REQUIREMENTS**C-0 Outfitting****Structural Systems**

Design Loads shall be as listed below and in accordance with the Fermilab Engineering Standards Manual:

- Roofs
 - Live load / snow load = 25 psf
 - Snow drift: 25 – 55 psf
 - Snow width = 6.5 ft.
- Stairs and Landings:
 - Dead load = 75 psf
 - Live load = 100 psf
 - or concentrated load of 300 pounds at center of tread.
- Floors shall be designed to support a concentrated load of 2000 lbs. applied to an area 2'-6" x 2'-6" and a uniform live load of 100 pounds per square foot (PSF) for computer floors and 50 PSF for office floors. In addition to the live load a superimposed dead load of 9.5 PSF will be used for the raised access floor and 4 PSF electrical, piping and mechanical equipment.

Live Load Reduction:

- Live load reductions are permitted in accordance with code for second floor.
- No live load reductions are permitted for roof or mechanical equipment areas.

Handrails and Guardrails:

- Top rail = 50 plf or 200 lb. concentrated load
(Applied any direction – not simultaneous)
- Infill area = 50 lbs. on an area 1'-0" x 1'-0"
(The above loads are not superimposed)

Mechanical Systems

The HVAC systems will conform to ASHRAE 90.1, ASHRAE 62 and applicable NFPA requirements and applicable sections of the Fermilab Engineering Standards Manual

Mechanical systems and controls will be further investigated during subsequent phases in accordance with ASHRAE 90.1 and Federal Life Cycle costing analysis.

PERFORMANCE REQUIREMENTS**C-0 Outfitting**

Heating, Ventilation and Air Conditioning Design Parameters:

- See Title 1 Mechanical Drawings M-1 through M-7

Electrical Systems

Electrical system modifications will comply with applicable sections of National Electric Code and applicable sections of the Fermilab Engineering Standards Manual. Separate distribution systems for the power supplies, house power and quite power for the computers will each be supplied by one of three 1500 kva primary transformers.

Primary Supply 480/277 V, 3 phase, 4 wire

Secondary Supply Power Distribution: 120/208 V, 3 phase, 4 wire

Lighting: 277 V

Illumination Levels:

Main Corridor and Public Areas: 20 fc.

Computer Rooms 50 fc.

Interior Emergency Lighting 5 fc.

Fire Protection Systems

Fire Alarm/Fire Suppression systems shall be designed in accordance with the applicable sections of the Fermilab Engineering Standards Manual.

Automatic sprinkler systems shall be designed to a minimum of an Ordinary Hazard Group 1 classification, in accordance with National Fire Protection Association (NFPA) latest edition. The most commonly used NFPA standards relative to automatic sprinkler systems are: 13, 20, 25, 231, 231C, 318, and 750. Fire alarm systems shall be designed with a minimum standby power (battery) capacity. These batteries shall be capable of maintaining the entire system in a non-alarm condition for 24 hours, in addition to 15 minutes in full load alarm condition. The most commonly used NFPA standards relative to fire alarm systems are: 70, 72, 90A, and 318.

**REQUIREMENTS AND
ASSESSMENTS****C-0 Outfitting****PART 1 SAFEGUARDS AND SECURITY**

Direction for security issues related to the design of this project is taken from the current operating procedures of the laboratory activities.

During non-working hours, when the building is unoccupied, all exterior roll-up and personnel access doors into the building will be locked and security guards will regularly inspect the building during routine security patrols of the Fermilab site.

PART 2 ENERGY CONSERVATION

All elements of this project will be reviewed for energy conservation features that can be effectively incorporated into the overall building design. Energy conservation techniques and high efficiency equipment will be utilized wherever appropriate to minimize the total energy consumption of the building.

PART 3 HEALTH AND SAFETY

Exiting for the building will be provided in accordance with NFPA 101 Life Safety Code to assure adequate egress in the event of an emergency. The building will also be provided with portable fire extinguishers appropriate for the intended use of the building.

PART 4 ENVIRONMENTAL PROTECTION

The overall environmental impact of this project will be evaluated and reviewed as required to conform to all applicable portions of the National Environmental Policy Act (NEPA).

PART 5 DECONTAMINATION AND DECOMMISSIONING

Decontamination and decommissioning procedures are an important part of Fermilab environment, safety and health policies. These policies are described in Chapter 8070 of the Fermilab Environment, Safety and Health Manual.

**Section
IV**

**REQUIREMENTS AND
ASSESSMENTS****C-0 Outfitting**

Appropriate decontamination and decommissioning procedures will be instituted for this project.

PART 6 QUALITY ASSURANCE

All aspects of this project will be periodically reviewed with regard to Quality Assurance issues from Conceptual Design through Title III completion. This review process will be completed in accordance with the applicable portions of the Fermilab Institutional Quality Assurance Program (FIQAP) currently under final development. The following elements will be included in the Fermilab Quality Assurance Program for the design and construction effort:

- An identification of staff assigned to this project with clear definition of responsibility levels and limit of authority as well as delineated lines of communication for exchange of information.
- Requirements for control of design criteria and criteria changes and recording of standards and codes used in the development of the criteria.
- Periodic review of design process, drawings and specification to insure compliance with accepted design criteria.
- Identification of underground utilities and facility interface points prior to the commencement of any construction in affected areas.
- Conformance to procedures regarding project updating and compliance with the approved construction schedule.
- Conformance to procedures regarding the review and approval of shop drawings, samples test results and other required submittals.
- Conformance to procedures for site inspection by Fermilab personnel to record construction progress and adherence to the approved contract documents.
- Verification of project completion, satisfactory system start-up and final project acceptance

PART 7 MAINTENANCE AND OPERATION

When completed, this project will become the formal responsibility of the Fermilab Particle Physics Division. The completed project, the utilities and systems that support it, will be added to the overall laboratory maintenance and building inspection program of the Facilities Engineering Services Section. The Facilities Engineering Services Section and Particle Physics Division will coordinate all preventative maintenance, normal service and emergency repairs for the building.

**REQUIREMENTS AND
ASSESSMENTS****C-0 Outfitting**

The Building Research Board National Research Council states that if a building receives an adequate level of maintenance and repair funding, a steady-state situation should exist wherein the inventory would remain in a service condition that would neither decline nor improve and a maintenance and repair backlog would not develop. Maintenance is defined as the day-to-

day work necessary to sustain property in order to realize the originally anticipated useful life of a fixed asset. Maintenance includes periodic inspection, adjustment, lubrication, and cleaning (non janitorial) of equipment, replacement of parts etc. to assure continuing service and to prevent breakdown. Repair is defined as the work required to restore damaged or worn-out property to a normal operating condition. In general, repairs are curative and maintenance is preventive.

Operations are the activities related to a building's normal performance of the function for which it is used. The cost of utilities, janitorial services, window cleaning, rodent control and waste management are generally included within the scope of operations and are not maintenance.

The following preliminary maintenance and repair costs forecast is based on information contained in the Whitestone Building and Repair Cost Reference 2002 escalated to FY2005 and indexed for the Chicago, Illinois area. The Building M&R Cost Profile is based on the Community Center model. While not an exact match, the functions and basic material selections are considered similar in nature to provide a preliminary forecast of maintenance and repair costs for this project.

	Annual Cost Per Square Foot	Annual Cost as % of Replacement Cost
Cost (FY2004)		
PM and Minor Repair	\$1.00	1.04%
Unscheduled Maintenance	\$1.15	1.18%
Renewal and Replacement	\$3.03	3.12%
Total M&R Costs	\$5.18	5.34%

If requested, a detailed maintenance and repair forecast for this project will be developed after the completion of Title 3. A copy of the referenced Whitestone

**REQUIREMENTS AND
ASSESSMENTS****C-0 Outfitting**

Building and Repair Cost Reference data is included in the Appendix of this document.

PART 8 TELECOMMUNICATIONS

The existing Fermilab telephone communications network is adequate to provide normal telecommunication support to the new work.

PART 9 COMPUTER EQUIPMENT

Access to the central computing cluster, located in the Feynman Computing Center will be provided by extending the existing data communication network.

**Section
IV****PART 10 HANDICAPPED PROVISIONS**

The applicable requirements of the Uniform Federal Accessibility Standards (UFAS), Americans with Disabilities Act (ADA) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG) will be incorporated into the design of this project. Compliance with the ADA will be based upon an evaluation of the job descriptions and required tasks for the personnel assigned to work in this building. Those areas included in the scope of this project that will require accessibility as well as the established routes to those areas will be designed in full compliance with the existing statutes.

PART 11 EMERGENCY SHELTER PROVISIONS

Required provision for occupant protection in the event of tornadoes or other extreme weather conditions are provided within the existing building. Guidelines established by the Federal Emergency Management Agency (FEMA) in publications TR-83A and TR-83B will be used to assess the existing building and addition to insure safe areas within the building for the protection of building occupants.

SUB-PROJECT ORGANIZATION
DOE Management**C-0 Outfitting**

- The roles, responsibilities and authorities provided by the Department of Energy (DOE) is described in the Draft Preliminary Project Execution Plan for BTeV and will be further defined in the Project Execution Plan at project approval.
- The Department of Energy provides funding for this project through the Fermilab annual budget process.
- The Fermi Area Office administers the M&O contract with URA for operations of Fermilab and exercises oversight of Fermilab. The Fermi Area Office Manager, Ms. Jane Monhart, has been delegated responsibility and authority for execution of the project.
- The DOE has delegated the responsibility for design and construction of this project to Fermilab.

Fermilab Management

The WBS 3.0 sub-project management team structure shown in Figure 1 identifies the organizational structure that will be responsible for design, procurement and construction of WBS 3.0 for the project.

As with all activities at Fermilab, the Directorate is at the highest level of responsibility.

Fermilab through Particle Physics Division (PPD) has designated Mr. Joel Butler and Mr. Sheldon Stone as Project Director and Deputy Project Director, respectively. Mr. Michael Lindgren has been designated as the Project Manager. The details of the WBS 3.0 C-0 Outfitting Project Management responsibilities have been identified in the Responsibilities Matrix contained in the appendix of this document.

Design, construction management, cost and schedule for the C-0 Outfitting portion of this project are the responsibility of the Facilities Engineering Services Section (FESS). FESS, headed by David Nevin, will manage the engineering and civil construction associated with this project. This effort will be accomplished using the resources of the FESS Engineering Group, led by manager Ed Crumpley. The Engineering Manager shall assure proper attention to the coordination and timely completion of the project.

SUB-PROJECT ORGANIZATION**C-0 Outfitting**

Tom Lackowski (WBS 3.0 Level 2 manager), of FESS/Engineering, will serve as Project Engineer and Construction Manager for this project. The Project Engineer/Construction Manager will utilize the resources of the Engineering Group as appropriate for design, construction phase support, and construction coordination. Portions of the civil design may be subcontracted to an Architectural/Engineering firm. A summary of the Project Engineer/Construction Manager functions and responsibilities is provided in the attached responsibilities matrix. Mr. Emil Huedem has been assigned as Task Coordinator for this project. The Task Coordinator will handle coordination of design team efforts. A summary of the Task Coordinator functions and responsibilities is provided in the attached responsibilities matrix.

The Business Services Section (BSS), headed by Dave Carlson, has the responsibility for contract administration, providing budget status and subcontract/requisition information. The details of the Procurement Administrator's responsibilities have been identified in the Responsibilities Matrix contained the appendix of this document.

ES&H Management

The ES&H Section, headed by Bill Griffing, with Mary Logue as Associate Head of the Health & Safety Group, has the responsibility for providing safety coordination support and oversight of safety throughout the project. As with all Fermilab projects, attention to ES&H concerns will be part of project management, safety and environmental compliance will be incorporated into all processes. Line management for safety and environmental compliance on this project will be the responsibility of the Particle Physics Division (PPD). Although line management will be the responsibility of PPD it is understood that for the work that is within the geographical boundaries of the Accelerator Division (AD) the AD rules and guidelines will be followed. In addition all work notification and excavation permits will obtain the approval of the AD Senior Safety Officer.

The ability to perform the construction work safely and in compliance with environmental requirements applicable to the project will be designed into the project. Construction documents (drawings and specifications) will be reviewed as the documents are developed, by Fermilab engineering, construction, environmental and safety professionals to ensure ES&H concerns are addressed. Project specific environmental, safety and health requirements for construction will be identified and outlined in the construction documents.

Job coordination during construction will be accomplished through the Fermilab Construction Coordinator (FCC), a member of FESS/Engineering, who shall be responsible for daily monitoring of all work at the site, including the ES&H

SUB-PROJECT ORGANIZATION**C-0 Outfitting**

program. The Construction Manager shall be the first line of contact with the Construction Subcontractor's organization. The FCC reports to the Construction Manager for this project. The Subcontractors will be pre-qualified for bidding by submitting specific information about their safety and health program with the bids. During construction the Subcontractors will use Project Hazard Analyzes (PHA) to plan the work and mitigate hazards. The FCC will audit the Subcontractor's compliance with the PHA's and with their overall Safety Plan. The Fermilab ES&H Section will support the FCC with safety personnel during construction.

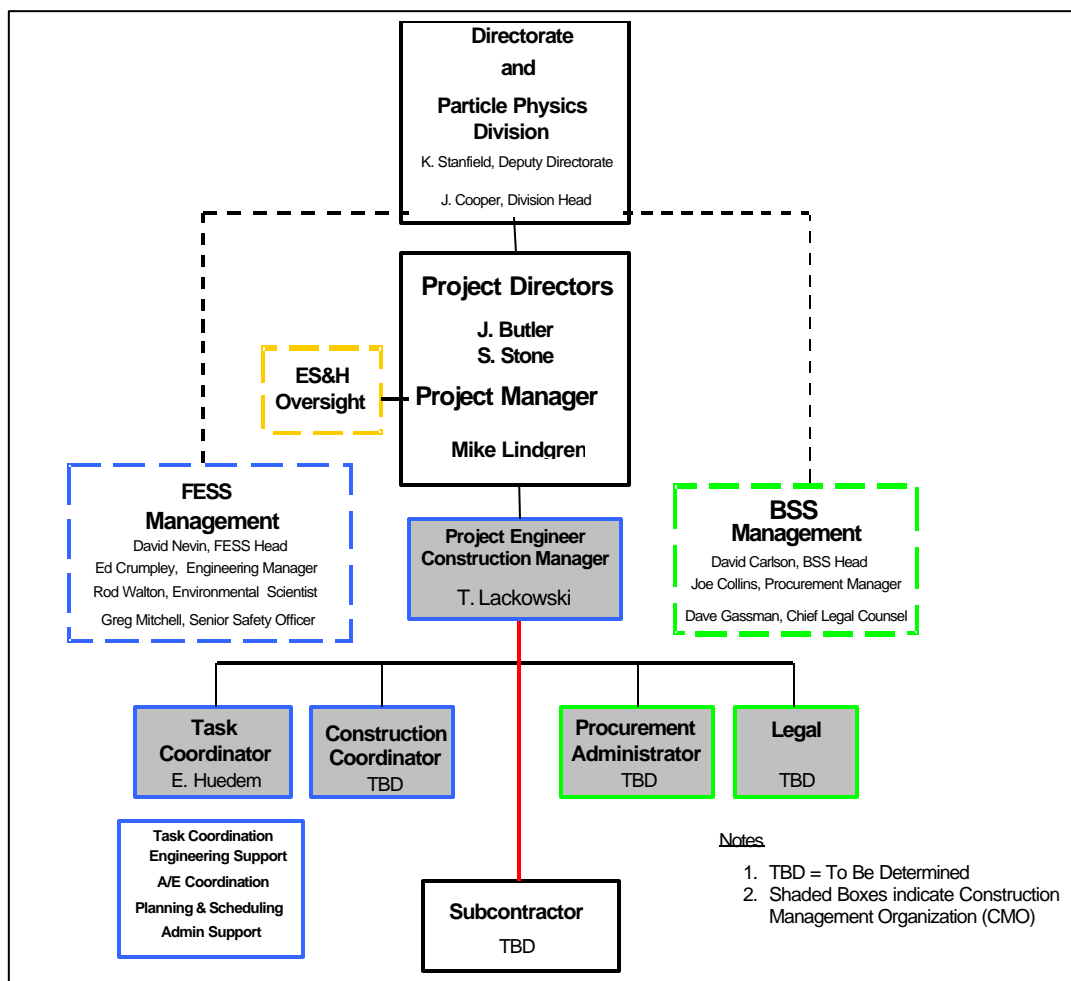


Figure 1 –Organizational Chart

RESOURCE REQUIREMENTS

C-0 Outfitting

Funding

This portion of the BTeV project has a burdened Estimated Cost (TEC) for WBS 3.0 of \$7,080,547 (TPC of \$7,138,531) including construction costs, EDIA, contingency, management reserve, and indirect costs. Escalation costs are held and accounted for in the Project Management portion of the project.

Personnel

Divisions and sections will be responsible for assigning the responsibilities of individuals within the design and construction organization as indicated in Figure 1 of Section C. In addition, Fermilab will provide the personnel required to adequately review and oversee design and construction phases.

Design reviews will occur at varying levels throughout Title II. All Divisions and Sections are aware of the design review process and will assign appropriate personnel to complete the reviews for conformance and compliance.

Divisions and Sections will provide required personnel to coordinate construction phase activities that directly affect them. For example, FESS will provide personnel to coordinate related activities with the Construction Manager and Construction Coordinator.

SUB-PROJECT OPERATIONAL PLAN**C-0 Outfitting**

The Project Baseline identifies the basis for evaluating project performance. The components are the Work Breakdown Structure, which identifies each component of the project, the Baseline Costs, Escalation Rates, and Baseline Schedule and Milestones.

Dictionary of Prime Sub-Project Activities

Listed below is an overview of the Prime activities for the C-0 Outfitting project. Further breakdown of the listed structure will be applied as required for accounting and project tracking purposes in the Open Plan schedule.

Engineering, Design and Inspection

ED&I activities include the engineering and design activities in Titles 1 and II, the inspection activities associated with Title III. The descriptions are based on DOE Directive G430.1-1, Chapter 6. In addition, DOE Directive G430.1-1, Chapter 25 was used as guidance in estimating the ED&I costs for this project. The appendix of this document contains these chapters.

Administration

Administration activities include those defined by DOE Directive G430.1-1, Chapter 6 as Project Management (PM) and Construction Management (CM). The appendix of this document contains this chapter of the DOE Directive.

Fixed Price Construction Contracts

Three or more Fixed Price Construction Contracts will be used for the majority of construction work associated with the C-0 Outfitting Project. All lower level tasks will be tracked for progress. Costs and payments will be based on percentage of installed product based on approved cost loaded construction schedule prepared by the Subcontractor.

Direct Procured Purchases

Items have been identified for direct procurement. These Items will be tracked individually.

Time and Materials (T&M)

Little or no T&M work is anticipated at this time. In the event T&M is deemed appropriate it will be costed with the associated Fixed Price Construction Contract project and task.

For accounting purposes, the indirect costs of WBS items will be included in the WBS items, when costed. For reference purposes Indirect Costs rates are defined by DOE Order 4700.1 that states indirect costs are "...costs incurred by an organization for common or joint objectives and which cannot be identified specifically with a particular activity or project. The multipliers used in this

SUB-PROJECT OPERATIONAL PLAN**C-0 Outfitting**

document are based on current Fermilab rates in effect as of October 2002. The appendix of this document contains this current Fermilab Indirect Cost rates.

The project management, construction management, design, construction and inspection for this project is being performed in compliance with the applicable DOE Orders and Laboratory Policy and Procedures and in accordance with the Work Breakdown Structure.

Design

If appropriate, the development of working drawings and bid packages may be accomplished by use of an Architectural-Engineering (A/E) firm in conjunction with the FESS/Engineering Project Team during Title II. The selection of the A/E firm will be based on qualifications and past performance on similar FESS projects. Existing professional services contract will be used to accomplish this work.

The A/E may be retained during Title III for engineering support of the following:

- Bid Period Information Requests;
- Amendment/Addendum Development;
- Shop Drawing/Submittal Review;
- Assistance in estimating and negotiating changes to the subcontracted work;
- Responding to subcontractor request for information including developing sketches/revisions to the subcontract documents
- Periodic site visits;
- Punchlist development.

Construction

The FESS/Engineering group will function as the construction manager for the construction projects, coordinating the subcontractor's construction contract. Field inspection, environment, safety and health, and quality control of construction activity will be the responsibility of the subcontractor. FESS/Engineering will provide quality and safety assurance during construction.

Contract Packages

The majority of the construction work for this project will be accomplished by means of one or more construction packages. The construction packages will be a competitively bid, lump sum contract. A Time and Materials (T&M) task may be used for preparatory work that is specialized and difficult to include in the competitive procurement process.

SUB-PROJECT OPERATIONAL PLAN**C-0 Outfitting**Possible Sources for the Construction

Fermilab has access to several Subcontractors that have sufficient qualifications to execute this Subcontract.

Performance Based Incentive Process

The subcontractor will be paid only for work completed. In addition, retention may be reduced from 10% to as little as 2% during the subcontract if the subcontractor maintains a safe environment and meets subcontract milestones.

Methods of Competition

The Request for Proposal (RFP) process will be used to solicit proposals from area Subcontractors with the appropriate safety records and experience to accomplish this work.

Source Selection Process

A Source Evaluation Team (SET) will be established which will include the WBS 3.0 Level 2 Project Manager, Construction Manager, Design Coordinator, and Procurement Officer to evaluate and select a Subcontractor for the Civil Construction Package. Evaluation criteria will be included in the RFP documents as a basis for the SET evaluation of proposals. The Source Evaluation Team will provide a recommendation to the Project Manager for approval.

Justification for Non-competitive Acquisitions

Anticipated non-competitive acquisitions may include T&M tasks and pre-procured items requiring longer than expected fabrication or delivery time. These items will be further identified during the Title 2 phase.

Milestones for Acquisition

Construction milestones will be established for inclusion into the subcontract documents.

PROJECT CONTROLS**C-0 Outfitting**

Project Controls, and Reporting Requirements
Are defined by the following documents

Project Execution Plan (PEP) – A DOE document, the final PEP will summarize the mission need and justification of the project, its objective and scope, the Department of Energy (DOE) management structure, the resource plan, and the environmental, safety, and health (ES&H) requirements. In addition, it establishes the technical, cost, and schedule baselines. DOE Baseline Change Control thresholds are also established in this document. Project cost, scope, and schedule.

Project Management Plan (PMP) – A document that defines the project's laboratory and project responsibilities. Describes mission need, organizational structure, roles and responsibilities, resource requirements, baselines, ISM, Acquisition Strategy, Technical Considerations, and project controls. Signed by Project, FNAL, and local DOE

Project Management Systems Descriptions (PMSD) describes the project management system implemented within the Fermi National Accelerator Laboratory (FNAL) to execute the BTeV project successfully. This manual describes:

- Overview of BTeV's project management process,
- Establishing project baselines, based on a complete Work Breakdown Structure and systematic planning, estimating, and scheduling of the work.
- Objectively assessing project performance (measuring earned value).
- Calculating, analyzing, and reporting significant variances from the baseline plan, forecasting the impacts, planning and executing corrective action, and revising the estimate at completion.
- Communicating and reporting to and among project participants and with management and sponsors.
- Assuring quality and reflecting quality assurance requirements in plans and implementation.
- Identifying, managing, and mitigating project risk.
- Authorizing work systematically.
- Controlling baseline changes.

**Section
VIII**

**DESIGN AND CONSTRUCTION
PRINCIPALS****C-0 Outfitting****Integrated Safety Management (ISM)**

Fermilab subscribes to the philosophy of Integrated Safety Management (ISM), in accordance with Department of Energy Order 413.3 "Program and Project Management for the Acquisition of Capital Assets." Fermilab requires its subcontractors and sub-tier subcontractors to do the same. ISM is a system for performing work safely and in an environmentally responsible manner. The term "integrated" is used to indicate that the Environment, Safety & Health (ES&H) management systems are normal and natural elements of doing work. The intent is to integrate the management of ES&H with the management of the other primary elements of construction: quality, cost, and schedule.

The subcontractors shall submit proof of an effective integrated safety management program. The program must be described in the terms listed below.

- Line Management Responsibility for Safety;
- Clear Roles and Responsibilities;
- Competence Commensurate with Responsibility;
- Balanced Priorities;
- Identification of Safety Standards and Requirements;
- Hazard Controls Tailored to Work Being Performed;
- Operations Authorization.

**Section
IX****Quality Assurance**

All aspects of this project will be periodically reviewed with regard to Quality Assurance issues from Conceptual Design through Title III completion. This review process will be completed in accordance with the applicable portions of the Director's Policy Manual, Section 10. The following elements will be included in the design and construction effort:

- An identification of staff assigned to this project with clear definition of responsibility levels and limit of authority as well as delineated lines of communication for exchange of information;
- Requirements for control of design criteria and criteria changes and recording of standards and codes used in the development of the criteria;
- Periodic review of design process, drawings and specification to insure compliance with accepted design criteria;
- Identification of underground utilities and facility interface points prior to the commencement of any construction in affected areas;

**DESIGN AND CONSTRUCTION
PRINCIPALS****C-0 Outfitting**

- Conformance to procedures regarding project updating and compliance with the approved construction schedule;
- Conformance to procedures regarding the review and approval of shop drawings, samples test results and other required submittals;
- Conformance to procedures for site inspection by Fermilab personnel to record construction progress and adherence to the approved contract documents;
- Verification of project completion, satisfactory system start-up and final project acceptance.

Sustainable Building Design

The project processes and each project element are evaluated to reduce their impact on natural resources without sacrificing program objectives. Fermilab designs will incorporate maintainability, aesthetics, environmental justice and program requirements to deliver a well-balanced project. If appropriate, internal and external reviews of design and construction provide a check and balance system for environmental, aesthetic and maintenance issues.

Reliability and Maintainability

Both reliability and future maintenance are considered in the design of all components of Fermilab site. Materials and construction techniques are selected during the design process to provide adequate design life, accessibility, and minimal maintenance.

Value Management

BTeV document # 3578 provides an overview of the Value Management program employed for the BTeV project and for this sub-project. Internal reviews of designs at various levels of completion have been performed by the most experienced individuals at Fermilab with the goal that more cost effective solutions are identified.

Risk Management

BTeV document # 3526 provides the details of the risk analysis for this sub-project. The majority of the risk management on this project involves the coordinated activities affecting ongoing Fermilab operations. Sufficient schedule float is currently anticipated for the activities related to constructing project to accommodate potential disruptions.

DESIGN AND CONSTRUCTION PRINCIPALS

C-0 Outfitting

Design Reviews

Internal design reviews are performed at approximately 50% completion and 100% completion. Designs are checked for conformance to project requirements at each review.

Contingency Analysis

BTeV document #3527 provides the details for the contingency analysis for this sub-project.

**DESIGN AND CONSTRUCTION
PRINCIPALS****C-0 Outfitting****Construction Activity Reporting**

Daily – If appropriate, construction logs may be prepared by the Construction Coordinator that document the ongoing progress, quality assurance, safety and change issues. When required, the Subcontractor prepares daily quality control reports documenting their efforts on field activities. The Construction Manager is provided these reports on the following workday.

Weekly – The Subcontractor submits a summary report of quality control activities for the previous week at the weekly construction meeting. These reports will include a “look ahead” schedule that details the expected progress in the coming weeks.

Reviews

Directorate Level Review – If appropriate and requested, the project team will meet with the Directorate to review the project related cost data, schedule status and performance progress.

Multi-Organization Construction Site Safety Walkthrough – These walkthroughs will occur on a bi-weekly basis or as requested by the participants. The walkthroughs will be completed in accordance with the ES&H section procedure. A copy of the procedure is included by reference.

APPLICABLE CODES, STANDARDS AND QUALITY LEVELS

C-0 Outfitting

The design of this project will be in accordance with recognized architectural and engineering practice and will comply with the applicable portions of the of the U.S. Department of Energy and the State of Illinois codes, orders and regulation as incorporated into contract No. DE-AC02-76CH0300 between the US Department of Energy and Universities Research Association.

IDOT, Standard Specifications for Road and Bridge Construction, latest edition
 IEPA, Illinois Urban Manual
 AASHTO, American Association of State Highway and Transportation Officials
 ASTM, American Society for Testing Materials
 10 CFR Part 435 Subpart A / ASHRAE 90.1 – 1989
 Clean Water Act
 Safe Drinking Water Act
 BOCA National Building Code
 NFPA - 101, Life Safety Code
 State of Illinois accessibility standards
 Americans with Disabilities Act (ADA)
 Americans with Disabilities Act Accessibility Guidelines (ADAAG)
 Uniform Federal Accessibility Standards (UFAS)
 FEMA TR-83A, Interim Guidelines for Building Occupant Protection from Tornadoes and Extreme Winds
 FEMA TR-83B, Tornado Protection - Selecting and Designing Safe Areas in Buildings
 American Concrete Institute (ACI), Building Code Requirements for Structural Concrete, ACI 318, latest edition
 ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 1995.
 ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American CRSI (Concrete Reinforcing Steel Institute)
 American Institute of Steel Construction, Specification for the Design, Fabrication and Erection of Structural Steel for Buildings, latest edition
 ASTM (American Society for Testing and Materials)
 AWS (American Welding Society)
 SDI (Steel Deck Institute), Design Manual for Composite Decks, Form Decks and Roof Decks.
 CFR (Code of Federal Regulations)
 29 CFR 1910 Occupational Safety and Health Standards
 29 CFR 1926 Safety and Health Regulations for Construction
 77 IAC 890 (Illinois Plumbing Code)
 ANSI/ASHRAE 14 (Mechanical refrigeration)
 ANSI/ASME B31.5 (Refrigeration piping)
 ANSI/ASME B31.8 (Gas transmission and piping systems)
 ASME Pressure Vessel Code-Section VIII
 ASME (American Society of Mechanical Engineers)
 A17.1 Safety Code for Elevators and Escalators
 NEMA (National Electrical Manufacturers Association)
 NFPA (National Fire Protection Association)
 NFPA 70 National Electric Code

Section X



APPLICABLE CODES, STANDARDS AND QUALITY LEVELS

C-0 Outfitting

NFPA 80 (National Fire Protection Agency) Fire Doors and Windows
Electrical: American National Standards Institute, National Electrical Safety Code, National Electrical Safety Code, ANSI C2, latest edition

Introduction

This is a building code examination for the B-TeV project at the existing C-0 Collision Hall. The project includes modifying the existing C-0 Collision Hall to accommodate three stories consisting of research laboratory, basement level consisting of mechanical support room, and a sub-basement consisting of a staging area. There will be an elevator for moving people and computer equipment. A typical computer floor is approximately 2,080 sq. ft., the mechanical support room is approximately 300 sq. ft., and the remaining area is 2,540 sq. ft. for a combined total of approximately 9,000 sq. ft. The structure will be approximately 35 feet in height above grade level, that is, of exposed wall and roof construction. The building construction primary consists of post-tension concrete and steel structural beams. There will be two stairways and three exterior doors constructed to accommodate egress. Finally, the building will be equipped with a fully automatic sprinkler system and fire alarm system. This examination excludes the Collision Hall.

Criteria Evaluation

The following was used for the model building code evaluation and requires independent reviews from Fermilab's outside fire protection engineering consultant and in-house comment and compliance review.

- DOE Order 420.1, Fire Protection – Section 4.2
- IBC, International Building Code, 2000 Edition
- NFPA 101, Life Safety Code, 2000 Edition
- NFPA 13, Standard of Installation of Automatic Sprinkler, 1999 Edition
- NFPA 70, National Electrical Code, 2002 Edition
- NFPA 72, Fire Alarm Code, 1999 Edition
- NFPA 75, Standard for the Protection of Information Technology, 2000 Edition
- NFPA 90A, Standard for Installation of Air-Conditioning, 1999 Edition
- ASHRAE Standard 90.1 - 1989
- ANSI 17.1 Safety Code for Elevators and Escalators, 2000 Edition
- Fermilab Environment, Safety and Health (ES&H) Manual
- Fermilab Engineering Standards

Examination

Occupancy Type

The uses will be limited to a research laboratory and as such, is classified by IBC Table 304 and NFPA 101 Section 3.3.134 as a Business Occupancy, "B".

Section X

APPLICABLE CODES, STANDARDS AND QUALITY LEVELS

C-0 Outfitting

Building Height and Area Limitations

The building will have a complete automatic sprinkler system and as such is allowed to be over three stories, limited to 60-feet in height, per the IBC. The building area is 10,875 square feet, less than the restricted 23,000 square feet permitted by IBC. Therefore, the building height and area is within the building area and height is within IBC Table 503 limitations.

Construction Type

In general, the building will be constructed of steel beams and concrete floors, unprotected and noncombustible. Therefore, the building is a Type II-B construction as defined by IBC, Section 602.2.

Wall and Floor Fire Separation

There is no requirement for fire rating the floors per IBC Section 602 and Section 713

Vertical Opening Fire Separation

The building will have three vertical openings that penetrate the main floors. These openings consist of two stairways and one elevator. The West stairway connecting all three stories will be constructed of a minimum of 1-hour fire resistive construction as defined by IBC Section 707 and 1003. The East stairway connecting all three stories and basements will be constructed of a minimum of 2-hour fire resistive construction as defined by IBC Section 707 and 1003. Both stairways will have a minimum width of 44-inches as outlined in IBC 1003.

The Elevator and utility shaft will be construction of a minimum of 2-hour fire resistive construction in accordance with IBC Section 707. The elevator will be classified as Limited-Use/Limited Application as defined by ANSI 17.1. Power disconnected will be provide in accordance with ANSI 17.1, Section 2.8 and the Emergency Operation and Signaling will comply with ANSI 17.1 Section 5.2.1.27.

Means of Egress

The building will have a minimum of two exits that discharge directly to the outside and two Stairwell exits that will also discharge directly to the outside serving the upper floors. The calculated occupant load for the building per NFPA 7.3.1.2 is 90 persons. The calculated occupant load is based on an occupant load factor of 1 person per 100 sq. ft gross floor area. The exit capacity is based on the exit doors, each having a clear width of 34-inches in accordance with NFPA 101, Section 7.2.1.2.2. The exit capacity can handle 850 persons and therefore, complies with IBC and NFPA egress requirements.

The travel distance length to an exit is 60-feet and is within the 300-feet limitation of NFPA 101, Section 38.2.6. The common path of travel is approximately 30-feet and is within the 75-feet limitation of NFP 101, Section 38.2.5.3. The dead corridor at column line 5 and C, is approximately 30-feet and is within the 50-feet limitation of NFPA 101, Section 38.2.5.2.

Fire Protection Systems

APPLICABLE CODES, STANDARDS AND QUALITY LEVELS

C-0 Outfitting

Automatic sprinkler systems will be an Ordinary Hazard Group I installed throughout the facility, and will be designed and installed in accordance with NFPA 13 and the Fermilab Engineering Standards. Fire alarm system will be installed throughout the facility and will be designed and installed in accordance with NFP 72 and the Fermilab Engineering Standards.

Other Building Components

Smoke detection will be installed below the raised computer floors and at the air handling units with automatic shut down of the air handling units, in accordance with NFPA 72, 75, and 90A. Exit signage and emergency lighting will be provided in accordance with NFPA 101. All electrical components will be installed in accordance NEC and Fermilab's standards. Lastly, all air handling and plumbing components will be installed in accordance with IBC, NFPA, ASHRA, and Illinois plumbing code.

COST ESTIMATE DETAIL

C-0 Outfitting

Section
XI

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
CONSTRUCTION											
				\$4,901,295	\$992,279	\$5,893,574			\$186,858	\$1,058,098	\$7,138,531
1 -- C-0 Outfitting Phase 1											
				\$1,737,180	\$276,404	\$2,013,585			\$55,280	\$345,599	\$2,414,465
1.1 -- Design to Award C-0 Phase 1											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.1 -- SC: Delay Proj. Start											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.1	SC: Delay Proj. Start	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.1.2 -- Title II EDIA FESS Phase 1											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.2	Title II EDIA FESS Phase 1	20d		\$0	\$0	\$0	20%	0%	\$0	\$0	\$0
1.1.3 -- Title II EDIA Consultant Phase 1											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.3	Title II EDIA Consultant Phase 1	15d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.1.4 -- Construction Req.											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.4	Construction Req.	5d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.1.5 -- Release for Bid											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.5	Release for Bid	5d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.1.6 -- Pre-Bid Meeting											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.6	Pre-Bid Meeting	1d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.1.7 -- Establish Source Criteria											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.7	Establish Source Criteria	3d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.1.8 -- Receive Proposals											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.8	Receive Proposals	20d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.1.9 -- Source Selection & Award											
				\$0	\$0	\$0			\$0	\$0	\$0
1.1.9	Source Selection & Award	15d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.2 -- Title 3 EDIA C-0 Outfitting Phase 1											
				\$9,551	\$276,404	\$285,956			\$55,280	\$0	\$341,237
1.2.1 -- Engineering Effort											
				\$6,651	\$276,404	\$283,056			\$55,280	\$0	\$338,337

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
1.2.1	Engineering Effort	266d	BTEV.MANDS,5734;BTEV.FNAL.FESS.EE,3280;BTEV.FNAL.MANDS.BASE,5734	\$6,651	\$276,404	\$283,056	20%	0%	\$55,280	\$0	\$338,337
1.2.2 -- Work Force Safety Promotions											
				\$2,900	\$0	\$2,900			\$0	\$0	\$2,900
1.2.2	Work Force Safety Promotions	266d	BTEV.FNAL.MANDS.BASE,2500;BTEV.MANDS,2500	\$2,900	\$0	\$2,900	0%	0%	\$0	\$0	\$2,900
1.3 -- C-0 Outfitting Phase 1 Construction Contract											
				\$1,727,628	\$0	\$1,727,628			\$0	\$345,599	\$2,073,228
1.3.1 -- SC: Delayed Const. Start											
				\$0	\$0	\$0			\$0	\$0	\$0
1.3.1	SC: Delayed Const. Start	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.2 -- Notice to Proceed											
				\$0	\$0	\$0			\$0	\$0	\$0
1.3.2	Notice to Proceed	1d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.3 -- Mobilize											
				\$18,580	\$0	\$18,580			\$0	\$3,716	\$22,297
1.3.3	Mobilize	10d	BTEV.FNAL.MANDS.BASE,16018;BTEV.MANDS,16018	\$18,580	\$0	\$18,580	0%	20%	\$0	\$3,716	\$22,297
1.3.4 -- Site Concrete											
				\$30,423	\$0	\$30,423			\$0	\$6,084	\$36,507
1.3.4.1	S & A Concrete Mix	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.4.2	S & A Rebar	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.4.3	FBP Foundations at Stair	7d	BTEV.FNAL.MANDS.BASE,6075;BTEV.MANDS,6075	\$7,047	\$0	\$7,047	0%	20%	\$0	\$1,409	\$8,456
1.3.4.4	Construct Hardstands	10d	BTEV.FNAL.MANDS.BASE,12265;BTEV.MANDS,12265	\$14,227	\$0	\$14,227	0%	20%	\$0	\$2,845	\$17,072
1.3.4.5	Site Utilities	7d	BTEV.FNAL.MANDS.BASE,4800;BTEV.MANDS,4800	\$5,568	\$0	\$5,568	0%	20%	\$0	\$1,113	\$6,681
1.3.4.6	Rework Temp Power	15d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.3.4.7	Demo Int. Stair Enclosure	3d	BTEV.FNAL.MANDS.BASE,3087;BTEV.MANDS,3087	\$3,580	\$0	\$3,580	0%	20%	\$0	\$716	\$4,297
1.3.5 -- Structural Steel & Weather Enclosures											
				\$236,396	\$0	\$236,396			\$0	\$47,279	\$283,675
1.3.5.1	S & A Steel Shop Drawings	20d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.5.2	Fab and ship Steel	30d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.5.3	Mezzinine Structural Steel	10d	BTEV.FNAL.MANDS.BASE,56702;BTEV.MANDS,56702	\$65,774	\$0	\$65,774	0%	20%	\$0	\$13,154	\$78,929
1.3.5.4	Structural Steel at Stair #3	8d	BTEV.FNAL.MANDS.BASE,17287;BTEV.MANDS,17287	\$20,052	\$0	\$20,052	0%	20%	\$0	\$4,010	\$24,063

BTeV - WBS 3.0 C0 Building Outfitting												
Total Construction Obligations (FY05\$)												
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead												
Non-Fermilab Labor: Salary, Benefits & Overhead												
Material Burdened												
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)	
1.3.5.5	Install Steel Stairs and misc.	4d	BTEV.MANDS,36224;BTEV.FNAL.MANDS.BASE,36224	\$42,019	\$0	\$42,019	0%	20%	\$0	\$8,403	\$50,423	
1.3.5.6	Siding & Roofing	17d	BTEV.FNAL.MANDS.BASE,93577;BTEV.MANDS,93577	\$108,549	\$0	\$108,549	0%	20%	\$0	\$21,709	\$130,259	
1.3.6 -- Structural Concrete												
				\$132,940	\$0	\$132,940			\$0	\$26,588	\$159,528	
1.3.6.1	S & A Rebar and Tendons.	14d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
1.3.6.2	Fab Rebar and Tendons	14d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
1.3.6.3	FBP Concrete @ El. 755'	19d	BTEV.MANDS,57302;BTEV.FNAL.MANDS.BASE,57302	\$66,470	\$0	\$66,470	0%	20%	\$0	\$13,294	\$79,764	
1.3.6.4	FBP Concrete @ El 764'	19d	BTEV.FNAL.MANDS.BASE,57302;BTEV.MANDS,57302	\$66,470	\$0	\$66,470	0%	20%	\$0	\$13,294	\$79,764	
1.3.7 -- Concrete Masonry												
				\$160,167	\$0	\$160,167			\$0	\$32,033	\$192,200	
1.3.7.1	S & A Masonry SD	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
1.3.7.2	S & A Doors and Glass	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
1.3.7.3	Concrete Masonry El 715-0	9d	BTEV.MANDS,9581;BTEV.FNAL.MANDS.BASE,9581	\$11,113	\$0	\$11,113	0%	20%	\$0	\$2,222	\$13,336	
1.3.7.4	Concrete Masonry El 731'-4	15d	BTEV.FNAL.MANDS.BASE,14371;BTEV.MANDS,14371	\$16,670	\$0	\$16,670	0%	20%	\$0	\$3,334	\$20,004	
1.3.7.5	Concrete Masonry El 746-6	16d	BTEV.MANDS,31805;BTEV.FNAL.MANDS.BASE,31805	\$36,893	\$0	\$36,893	0%	20%	\$0	\$7,378	\$44,272	
1.3.7.6	Concrete Masonry El 755-4	9d	BTEV.FNAL.MANDS.BASE,23952;BTEV.MANDS,23952	\$27,784	\$0	\$27,784	0%	20%	\$0	\$5,556	\$33,341	
1.3.7.7	Concrete Masonry El 766-0	9d	BTEV.FNAL.MANDS.BASE,23952;BTEV.MANDS,23952	\$27,784	\$0	\$27,784	0%	20%	\$0	\$5,556	\$33,341	
1.3.7.8	Install Doors and Glass	6d	BTEV.FNAL.MANDS.BASE,34414;BTEV.MANDS,34414	\$39,920	\$0	\$39,920	0%	20%	\$0	\$7,984	\$47,904	
1.3.8 -- Conveying System												
				\$152,488	\$0	\$152,488			\$0	\$30,497	\$182,985	
1.3.8.1	S & A Elevator SD	50d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
1.3.8.2	Fab and Del elev Rails	25d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
1.3.8.3	Install elev rails	10d	BTEV.MANDSEXEMPT,28400;BTEV.FNAL.MANDSEXEMPT,28400	\$28,400	\$0	\$28,400	0%	20%	\$0	\$5,680	\$34,080	
1.3.8.4	Install Elevator Machine Rm	15d	BTEV.MANDSEXEMPT,56801;BTEV.FNAL.MANDSEXEMPT,56801	\$56,801	\$0	\$56,801	0%	20%	\$0	\$11,360	\$68,161	
1.3.8.5	Demo Roof	2d	BTEV.FNAL.MANDSEXEMPT,1185;BTEV.MANDSEXEMPT,1185	\$1,185	\$0	\$1,185	0%	20%	\$0	\$237	\$1,422	

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
1.3.8.6	Frame, Side & Roof Elevator Head house	10d	BTEV.MANDSEXEMPT,9301;BTEV.FNAL.MANDSEXEMPT,9301	\$9,301	\$0	\$9,301	0%	20%	\$0	\$1,860	\$11,161
1.3.8.7	Install Elevator Cab	10d	BTEV.MANDSEXEMPT,56801;BTEV.FNAL.MANDSEXEMPT,56801	\$56,801	\$0	\$56,801	0%	20%	\$0	\$11,360	\$68,161
1.3.8.8	Energize and Test Elevator	2d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.3.9 -- Finishes											
				\$80,428	\$0	\$80,428			\$0	\$16,159	\$96,587
1.3.9.1	Paint Block Walls	10d	BTEV.FNAL.MANDSEXEMPT,18769;BTEV.MANDSEXEMPT,18769	\$18,769	\$0	\$18,769	0%	20%	\$0	\$3,753	\$22,522
1.3.9.2	Painting including Doors & Glass Frames	4d	BTEV.MANDSEXEMPT,10959;BTEV.FNAL.MANDSEXEMPT,10959	\$10,959	\$0	\$10,959	0%	20%	\$0	\$2,191	\$13,150
1.3.9.3	Rough In Toilet Rm Plumbing	20d	BTEV.MANDSEXEMPT,23498;BTEV.FNAL.MANDSEXEMPT,23498	\$23,498	\$0	\$23,498	0%	20%	\$0	\$4,699	\$28,197
1.3.9.4	Toilet RM Walls	7d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.3.9.5	Toilet Rm Finishes	15d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.3.9.6	Trim out Toilet Rm. Fixtures	4d	BTEV.FNAL.MANDSEXEMPT,23498;BTEV.MANDSEXEMPT,23498	\$23,498	\$0	\$23,498	0%	20%	\$0	\$4,699	\$28,197
1.3.9.7	Install Toilet Room Exhaust	2d	BTEV.MANDSEXEMPT,3704;BTEV.FNAL.MANDSEXEMPT,3704	\$3,704	\$0	\$3,704	0%	22%	\$0	\$814	\$4,518
1.3.10 -- Fire Protection											
				\$96,654	\$0	\$96,654			\$0	\$19,330	\$115,984
1.3.10.1	SC: Delay Start of FP	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.10.2	Install Fire Riser to High Bay	4d	BTEV.FNAL.MANDSEXEMPT,8406;BTEV.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087
1.3.10.3	Install Fire Riser to Side bay	4d	BTEV.MANDSEXEMPT,8406;BTEV.FNAL.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087
1.3.10.4	Rough In Sprinklers EI 731'-4"	5d	BTEV.MANDSEXEMPT,8406;BTEV.FNAL.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087
1.3.10.5	Rough In sprinklers EI 746'-6	10d	BTEV.MANDSEXEMPT,12604;BTEV.FNAL.MANDSEXEMPT,12604	\$12,604	\$0	\$12,604	0%	20%	\$0	\$2,520	\$15,124
1.3.10.6	Rough In Sprinklers EI.755'-4	5d	BTEV.FNAL.MANDSEXEMPT,12604;BTEV.MANDSEXEMPT,12604	\$12,604	\$0	\$12,604	0%	20%	\$0	\$2,520	\$15,124
1.3.10.7	Rough In Sprinklers EI 766'-0	10d	BTEV.MANDSEXEMPT,12604;BTEV.FNAL.MANDSEXEMPT,12604	\$12,604	\$0	\$12,604	0%	20%	\$0	\$2,520	\$15,124
1.3.10.8	Trim Out Sprinklers EI 731'-4"	4d	BTEV.FNAL.MANDSEXEMPT,8406;BTEV.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
1.3.10.9	Trim Out sprinklers EI 746'-6	4d	BTEV.MANDSEXEMPT,8406;BTEV.FNAL.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087
1.3.10.10	Trim Out Sprinklers EI.755'-4	4d	BTEV.FNAL.MANDSEXEMPT,8406;BTEV.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087
1.3.10.11	Trim Out Sprinklers EI 766'-0	4d	BTEV.FNAL.MANDSEXEMPT,8406;BTEV.MANDSEXEMPT,8406	\$8,406	\$0	\$8,406	0%	20%	\$0	\$1,681	\$10,087
1.3.11 -- Fire Detection											
				\$88,905	\$0	\$88,905			\$0	\$17,781	\$106,686
1.3.11.1	Fire Detection EI 731'-4"	17d	BTEV.MANDSEXEMPT,9878;BTEV.FNAL.MANDSEXEMPT,9878	\$9,878	\$0	\$9,878	0%	20%	\$0	\$1,975	\$11,853
1.3.11.2	Fire Detection EI 746'-6	10d	BTEV.FNAL.MANDSEXEMPT,19757;BTEV.MANDSEXEMPT,19757	\$19,757	\$0	\$19,757	0%	20%	\$0	\$3,951	\$23,708
1.3.11.3	Fire Detection EI.755'-4	10d	BTEV.FNAL.MANDSEXEMPT,19757;BTEV.MANDSEXEMPT,19757	\$19,757	\$0	\$19,757	0%	20%	\$0	\$3,951	\$23,708
1.3.11.4	Fire Detection EI 766'-0	10d	BTEV.FNAL.MANDSEXEMPT,19757;BTEV.MANDSEXEMPT,19757	\$19,757	\$0	\$19,757	0%	20%	\$0	\$3,951	\$23,708
1.3.11.5	Upgrade Fire Control Panel	4d	BTEV.FNAL.MANDSEXEMPT,9878;BTEV.MANDSEXEMPT,9878	\$9,878	\$0	\$9,878	0%	20%	\$0	\$1,975	\$11,853
1.3.11.6	TestI Fire Detection	3d	BTEV.MANDSEXEMPT,9878;BTEV.FNAL.MANDSEXEMPT,9878	\$9,878	\$0	\$9,878	0%	20%	\$0	\$1,975	\$11,853
1.3.12 -- Power Distribution and Lighting											
				\$171,276	\$0	\$171,276			\$0	\$34,255	\$205,531
1.3.12.1	S & A Electrical Devices	60d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.12.2	Rough In House Power EI 715'-0	25d	BTEV.FNAL.MANDSEXEMPT,80659;BTEV.MANDSEXEMPT,80659	\$80,659	\$0	\$80,659	0%	20%	\$0	\$16,131	\$96,790
1.3.12.3	Trim Out House Power EI 715'-0	20d	BTEV.MANDSEXEMPT,80659;BTEV.FNAL.MANDSEXEMPT,80659	\$80,659	\$0	\$80,659	0%	20%	\$0	\$16,131	\$96,790
1.3.12.4	Install Exist. 2000 Amp Switchbd	14d	BTEV.MANDSEXEMPT,9958;BTEV.FNAL.MANDSEXEMPT,9958	\$9,958	\$0	\$9,958	0%	20%	\$0	\$1,991	\$11,949
1.3.12.5	Pull and terminate secondary	22d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
1.3.13 -- Feeder From B-4 to C-0											
				\$437,067	\$0	\$437,067			\$0	\$87,413	\$524,480
1.3.13.1	Concrete and Rebar SD	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
1.3.13.2	Install Duct bank B-4 to Berm	7d	BTEV.FNAL.MANDSEXEMPT,42838;BTEV.MANDSEXEMPT,42838	\$42,838	\$0	\$42,838	0%	20%	\$0	\$8,567	\$51,405

<p align="center">BTeV - WBS 3.0 C0 Building Outfitting</p> <p align="center">Total Construction Obligations (FY05\$)</p> <p align="center">Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead</p> <p align="center">Non-Fermilab Labor: Salary, Benefits & Overhead</p> <p align="center">Material Burdened</p>	
--	--

[illegible]

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.1	SC: Delayed Start of Eng.	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.1.2 -- Title II EDIA FESS											
				\$0	\$187,185	\$187,185			\$37,437	\$0	\$224,623
2.1.2	Title II EDIA FESS	50d	BTEV.FNAL.FESS.EE,2221	\$0	\$187,185	\$187,185	20%	0%	\$37,437	\$0	\$224,623
2.1.3 -- Title II EDIA Consultant											
				\$46,400	\$0	\$46,400			\$0	\$9,280	\$55,680
2.1.3	Title II EDIA Consultant	40d	BTEV.FNAL.MANDS.BASE,40000;BTEV.MANDS,40000	\$46,400	\$0	\$46,400	0%	20%	\$0	\$9,280	\$55,680
2.1.4 -- Construction Req.											
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.4	Construction Req.	5d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.1.5 -- Release for Bid											
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.5	Release for Bid	5d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.1.6 -- Pre- Bid Meeting											
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.6	Pre- Bid Meeting	1d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.1.7 -- Establish Source Criteria											
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.7	Establish Source Criteria	3d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.1.8 -- Receive Proposals											
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.8	Receive Proposals	25d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.1.9 -- Source Selection& Award											
				\$0	\$0	\$0			\$0	\$0	\$0
2.1.9	Source Selection& Award	15d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.2 -- Title 3 EDIA C-0 Outfitting Phase 2											
				\$2,900	\$256,885	\$259,785			\$51,377	\$0	\$311,162
2.2.1 -- Engineering Effort											
				\$0	\$256,885	\$256,885			\$51,377	\$0	\$308,262
2.2.1	Engineering Effort	150d	BTEV.FNAL.FESS.EE,3048	\$0	\$256,885	\$256,885	20%	0%	\$51,377	\$0	\$308,262
2.2.2 -- Work Force Safety Promotions											
				\$2,900	\$0	\$2,900			\$0	\$0	\$2,900
2.2.2	Work Force Safety Promotions	150d	BTEV.MANDS,2500;BTEV.FNAL.MANDS.BASE,2500	\$2,900	\$0	\$2,900	0%	0%	\$0	\$0	\$2,900
2.3 -- C-0 Outfitting Phase 2 Construction Contract											
				\$1,889,068	\$0	\$1,889,068			\$0	\$458,301	\$2,347,369

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
2.3.1 -- SC: Delayed Start of Construction											
				\$0	\$0	\$0			\$0	\$0	\$0
2.3.1	SC: Delayed Start of Construction	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.2 -- Notice to Proceed											
				\$0	\$0	\$0			\$0	\$0	\$0
2.3.2	Notice to Proceed	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.3 -- Mobilize											
				\$0	\$0	\$0			\$0	\$0	\$0
2.3.3	Mobilize	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.4 -- Site Concrete											
				\$114,016	\$0	\$114,016			\$0	\$29,644	\$143,660
2.3.4.1	FBP Chiller Pads	5d	BTEV.FNAL.MANDS. BASE,29635;BTEV.MANDS,29635	\$34,376	\$0	\$34,376	0%	26%	\$0	\$8,937	\$43,314
2.3.4.2	FBP Condenser Pads	7d	BTEV.FNAL.MANDS. BASE,44453;BTEV.MANDS,44453	\$51,565	\$0	\$51,565	0%	26%	\$0	\$13,407	\$64,972
2.3.4.3	Construct Gas House	12d	BTEV.MANDS,24202;BTEV.FNAL. MANDS.BASE,24202	\$28,074	\$0	\$28,074	0%	26%	\$0	\$7,299	\$35,373
2.3.5 -- Masonry											
				\$50,689	\$0	\$50,689			\$0	\$11,151	\$61,841
2.3.5.1	S & A Finishes	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.5.2	C-0 Service Bldg. Mods	7d	BTEV.MANDS,10111;BTEV.FNAL. MANDS.BASE,10111	\$11,728	\$0	\$11,728	0%	22%	\$0	\$2,580	\$14,309
2.3.5.3	C-0 SB Buss Duct Enclosure	10d	BTEV.FNAL.MANDS. BASE,33587;BTEV.MANDS,33587	\$38,960	\$0	\$38,960	0%	22%	\$0	\$8,571	\$47,532
2.3.6 -- Finishes											
				\$221,492	\$0	\$221,492			\$0	\$54,555	\$276,048
2.3.6.1	Fab and Deliver Finishes	40d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.6.2	Flooring & Carpeting EI 755'-4	4d	BTEV.FNAL.MANDS. BASE,14256;BTEV.MANDS,14256	\$16,536	\$0	\$16,536	0%	22%	\$0	\$3,638	\$20,175
2.3.6.3	Install Computer Floor EI 746'-6	10d	BTEV.FNAL.MANDS. BASE,62795;BTEV.MANDS,62795	\$72,842	\$0	\$72,842	0%	26%	\$0	\$18,938	\$91,781
2.3.6.4	Install Computer Floor EI. 766'-0	10d	BTEV.FNAL.MANDS. BASE,62795;BTEV.MANDS,62795	\$72,842	\$0	\$72,842	0%	26%	\$0	\$18,938	\$91,781
2.3.6.5	C-0 Service Bldg. Mods	25d	BTEV.MANDS,51096;BTEV.FNAL. MANDS.BASE,51096	\$59,271	\$0	\$59,271	0%	22%	\$0	\$13,039	\$72,311
2.3.7 -- HVAC System											
				\$403,829	\$0	\$403,829			\$0	\$89,768	\$493,598
2.3.7.1	S & A HVAC Units	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.7.2	F & D HVAC Units	30d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0

<p align="center"> BTeV - WBS 3.0 C0 Building Outfitting Total Construction Obligations (FY05\$) Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead Non-Fermilab Labor: Salary, Benefits & Overhead Material Burdened </p>	
--	--

Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
2.3.7.3	SC: Delayed HVAC Start	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.7.4	Install HVAC Units Coll. Hall & Assem Hall	10d	BTEV.FNAL.MANDS. BASE,69149;BTEV.MANDS,69149	\$80,212	\$0	\$80,212	0%	22%	\$0	\$17,646	\$97,859
2.3.7.5	Install HVAC Units + Off & MUA	10d	BTEV.FNAL.MANDS. BASE,30098;BTEV.MANDS,30098	\$34,913	\$0	\$34,913	0%	22%	\$0	\$7,681	\$42,594
2.3.7.6	Duct Work	6d	BTEV.FNAL.MANDS. BASE,66438;BTEV.MANDS,66438	\$77,068	\$0	\$77,068	0%	22%	\$0	\$16,954	\$94,023
2.3.7.7	Install Ductwk EI 75'-4"	10d	BTEV.FNAL.MANDS. BASE,12348;BTEV.MANDS,12348	\$14,323	\$0	\$14,323	0%	22%	\$0	\$3,151	\$17,474
2.3.7.8	Install Motorized Dampers and Louvers	5d	BTEV.FNAL.MANDS. BASE,12348;BTEV.MANDS,12348	\$14,323	\$0	\$14,323	0%	22%	\$0	\$3,151	\$17,474
2.3.7.9	Install Purge and return fan	1d	BTEV. MANDSEXEMPT,18522;BTEV. FNAL.MANDSEXEMPT,18522	\$18,522	\$0	\$18,522	0%	22%	\$0	\$4,074	\$22,596
2.3.7.10	Insulate Ductwork	4d	BTEV. MANDSEXEMPT,37044;BTEV. FNAL.MANDSEXEMPT,37044	\$37,044	\$0	\$37,044	0%	22%	\$0	\$8,149	\$45,193
2.3.7.12	Install Mech Room Exhaust	2d	BTEV.FNAL. MANDSEXEMPT,6174;BTEV. MANDSEXEMPT,6174	\$6,174	\$0	\$6,174	0%	22%	\$0	\$1,358	\$7,532
2.3.7.13	Install DCW pipe and Humidifier	2d	BTEV.FNAL. MANDSEXEMPT,14818;BTEV. MANDSEXEMPT,14818	\$14,818	\$0	\$14,818	0%	22%	\$0	\$3,259	\$18,077
2.3.7.14	Balance HVAC System, Assy, Off & MUA	2d	BTEV.FNAL. MANDSEXEMPT,5704;BTEV. MANDSEXEMPT,5704	\$5,704	\$0	\$5,704	0%	22%	\$0	\$1,254	\$6,958
2.3.7.15	Install Sensors and Controls	5d	BTEV. MANDSEXEMPT,58344;BTEV. FNAL.MANDSEXEMPT,58344	\$58,344	\$0	\$58,344	0%	22%	\$0	\$12,835	\$71,179
2.3.7.16	Start Up and Comm (Non Shutdownn Related)	4d	BTEV. MANDSEXEMPT,19244;BTEV. FNAL.MANDSEXEMPT,19244	\$19,244	\$0	\$19,244	0%	22%	\$0	\$4,233	\$23,477
2.3.7.17	Install CRAC Condensing Unit AC for EI 746	6d	BTEV.FNAL. MANDSEXEMPT,16719;BTEV. MANDSEXEMPT,16719	\$16,719	\$0	\$16,719	0%	26%	\$0	\$4,346	\$21,065
2.3.7.18	Install Ref Piping Test, Fill and Charge Ins and Startup	4d	BTEV.FNAL. MANDSEXEMPT,6419;BTEV. MANDSEXEMPT,6419	\$6,419	\$0	\$6,419	0%	26%	\$0	\$1,668	\$8,087
2.3.8 -- Chilled Water System (CHW)											
				\$311,353	\$0	\$311,353			\$0	\$80,951	\$392,304
2.3.8.1	S & A Chillers, W/ Controls	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.8.2	F & D Chillers W/ Controls	40d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.8.3	S & A Chilled Water Pumps	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.8.4	F & D Chilled Water Pumps	36d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.8.5	SC: Delayed Chiller Equip.	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0

BTeV - WBS 3.0 C0 Building Outfitting Total Construction Obligations (FY05\$) Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead Non-Fermilab Labor: Salary, Benefits & Overhead Material Burdened												
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)	
2.3.8.6	Install Chillers	3d	BTEV. MANDSEXEMPT,110416;BTEV. FNAL.MANDSEXEMPT,110416	\$110,416	\$0	\$110,416	0%	26%	\$0	\$28,708	\$139,124	
2.3.8.7	Install Chilled Water Pumps	5d	BTEV.FNAL. MANDSEXEMPT,4229;BTEV. MANDSEXEMPT,4229	\$4,229	\$0	\$4,229	0%	26%	\$0	\$1,099	\$5,328	
2.3.8.8	Install CHW piping supports and Fittings	10d	BTEV.FNAL. MANDSEXEMPT,43909;BTEV. MANDSEXEMPT,43909	\$43,909	\$0	\$43,909	0%	26%	\$0	\$11,416	\$55,325	
2.3.8.9	Install Tanks and Other Hydronic items	10d	BTEV.FNAL. MANDSEXEMPT,11082;BTEV. MANDSEXEMPT,11082	\$11,082	\$0	\$11,082	0%	26%	\$0	\$2,881	\$13,963	
2.3.8.10	Install ECW pipe header on 746 Comp Rm.	6d	BTEV. MANDSEXEMPT,17100;BTEV. FNAL.MANDSEXEMPT,17100	\$17,100	\$0	\$17,100	0%	26%	\$0	\$4,446	\$21,546	
2.3.8.11	ECP -02 Trigger Add. CHW	1d	BTEV.FNAL. MANDSEXEMPT,30258;BTEV. MANDSEXEMPT,30258	\$30,258	\$0	\$30,258	0%	26%	\$0	\$7,867	\$38,125	
2.3.8.12	Leak test and Insulate ECW Header	4d	BTEV.MANDSEXEMPT,5700;BTEV. FNAL.MANDSEXEMPT,5700	\$5,700	\$0	\$5,700	0%	26%	\$0	\$1,482	\$7,182	
2.3.8.13	Leak test & Insulate CHW	6d	BTEV.FNAL. MANDSEXEMPT,9567;BTEV. MANDSEXEMPT,9567	\$9,567	\$0	\$9,567	0%	26%	\$0	\$2,487	\$12,054	
2.3.8.14	Install Sensors and Controls	6d	BTEV.FNAL. MANDSEXEMPT,49593;BTEV. MANDSEXEMPT,49593	\$49,593	\$0	\$49,593	0%	26%	\$0	\$12,894	\$62,487	
2.3.8.15	Flush tag and Fill System	1d	BTEV.MANDSEXEMPT,3704;BTEV. FNAL.MANDSEXEMPT,3704	\$3,704	\$0	\$3,704	0%	26%	\$0	\$963	\$4,667	
2.3.8.16	Startup & Bal CHW	1d	BTEV.MANDSEXEMPT,3257;BTEV. FNAL.MANDSEXEMPT,3257	\$3,257	\$0	\$3,257	0%	26%	\$0	\$846	\$4,103	
2.3.8.17	Comm and Training	5d	BTEV. MANDSEXEMPT,22538;BTEV. FNAL.MANDSEXEMPT,22538	\$22,538	\$0	\$22,538	0%	26%	\$0	\$5,859	\$28,397	
2.3.9 -- High Density Computer Cooling												
				\$235,183	\$0	\$235,183			\$0	\$61,147	\$296,330	
2.3.9.1	S & A Computer Rm. Air Handlers	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
2.3.9.2	F & D Computer Room Air handlers	30d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
2.3.9.3	Install Comp. Rm Condensers pad mnt.	12d	BTEV.FNAL. MANDSEXEMPT,81497;BTEV. MANDSEXEMPT,81497	\$81,497	\$0	\$81,497	0%	26%	\$0	\$21,189	\$102,686	
2.3.9.4	Install Comp room Air handlers EI; 766	12d	BTEV.FNAL. MANDSEXEMPT,93143;BTEV. MANDSEXEMPT,93143	\$93,143	\$0	\$93,143	0%	26%	\$0	\$24,217	\$117,360	
2.3.9.5	Ref. Piping CRAC	8d	BTEV. MANDSEXEMPT,14818;BTEV. FNAL.MANDSEXEMPT,14818	\$14,818	\$0	\$14,818	0%	26%	\$0	\$3,852	\$18,670	
2.3.9.6	Leak Test and Charge Ref Piping	4d	BTEV.MANDSEXEMPT,3754;BTEV. FNAL.MANDSEXEMPT,3754	\$3,754	\$0	\$3,754	0%	26%	\$0	\$976	\$4,730	

<p align="center">BTeV - WBS 3.0 C0 Building Outfitting</p> <p align="center">Total Construction Obligations (FY05\$)</p> <p align="center">Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead</p> <p align="center">Non-Fermilab Labor: Salary, Benefits & Overhead</p> <p align="center">Material Burdened</p>	
--	--

Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
2.3.9.7	Install DCW & Humidifier	2d	BTEV. MANDSEXEMPT,11113;BTEV. FNAL.MANDSEXEMPT,11113	\$11,113	\$0	\$11,113	0%	26%	\$0	\$2,889	\$14,002
2.3.9.8	Insulate and Tag Piping	3d	BTEV. MANDSEXEMPT,14510;BTEV. FNAL.MANDSEXEMPT,14510	\$14,510	\$0	\$14,510	0%	26%	\$0	\$3,772	\$18,282
2.3.9.9	Install Controls	4d	BTEV. MANDSEXEMPT,12965;BTEV. FNAL.MANDSEXEMPT,12965	\$12,965	\$0	\$12,965	0%	26%	\$0	\$3,370	\$16,335
2.3.9.10	Startup Balance Comm and Training	2d	BTEV.MANDSEXEMPT,3383;BTEV. FNAL.MANDSEXEMPT,3383	\$3,383	\$0	\$3,383	0%	26%	\$0	\$879	\$4,262
2.3.10 -- Motor Control Center (MCC)											
				\$32,863	\$0	\$32,863			\$0	\$8,544	\$41,407
2.3.10.1	S & A MCC	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.10.2	F & D Motor Control Center	30d		\$0	\$0	\$0	0%	22%	\$0	\$0	\$0
2.3.10.3	Install Motor Control Center	20d	BTEV. MANDSEXEMPT,32863;BTEV. FNAL.MANDSEXEMPT,32863	\$32,863	\$0	\$32,863	0%	26%	\$0	\$8,544	\$41,407
2.3.11 -- Power Distribution and Lighting											
				\$217,270	\$0	\$217,270			\$0	\$47,799	\$265,069
2.3.11.1	S & A Material Submittals	21d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.11.2	Fab and Del.	15d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.11.3	SC: Delayed Start of elec.	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
2.3.11.4	Rough In Power & Lighting EI 731	10d	BTEV. MANDSEXEMPT,45322;BTEV. FNAL.MANDSEXEMPT,45322	\$45,322	\$0	\$45,322	0%	22%	\$0	\$9,970	\$55,292
2.3.11.5	Rough In Power & Lighting EI 746'-6	15d	BTEV. MANDSEXEMPT,11114;BTEV. FNAL.MANDSEXEMPT,11114	\$11,114	\$0	\$11,114	0%	22%	\$0	\$2,445	\$13,559
2.3.11.6	Rough In Power & Lighting EI. 755'-4	10d	BTEV. MANDSEXEMPT,24977;BTEV. FNAL.MANDSEXEMPT,24977	\$24,977	\$0	\$24,977	0%	22%	\$0	\$5,494	\$30,471
2.3.11.7	Rough In Power & Lighting EI 766'-0	10d	BTEV.FNAL. MANDSEXEMPT,27222;BTEV. MANDSEXEMPT,27222	\$27,222	\$0	\$27,222	0%	22%	\$0	\$5,988	\$33,210
2.3.11.8	Trim Out House Power EI 731'-0	10d	BTEV.FNAL. MANDSEXEMPT,45322;BTEV. MANDSEXEMPT,45322	\$45,322	\$0	\$45,322	0%	22%	\$0	\$9,970	\$55,292
2.3.11.9	Trim Out Power & Lighting EI 746'-6	10d	BTEV. MANDSEXEMPT,11114;BTEV. FNAL.MANDSEXEMPT,11114	\$11,114	\$0	\$11,114	0%	22%	\$0	\$2,445	\$13,559
2.3.11.10	Trim Out Power & Lighting EI. 755'-4	10d	BTEV. MANDSEXEMPT,24977;BTEV. FNAL.MANDSEXEMPT,24977	\$24,977	\$0	\$24,977	0%	22%	\$0	\$5,494	\$30,471
2.3.11.11	Trim Out Power & Lighting EI 766'-0	10d	BTEV.FNAL. MANDSEXEMPT,27222;BTEV. MANDSEXEMPT,27222	\$27,222	\$0	\$27,222	0%	22%	\$0	\$5,988	\$33,210
2.3.12 -- Side Bay Computer Power											

Material Burdened

12 of 19

WBS3_0

Material Burdened

13 of 19

WBS3_0

<p align="center"> BTeV - WBS 3.0 C0 Building Outfitting Total Construction Obligations (FY05\$) Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead Non-Fermilab Labor: Salary, Benefits & Overhead Material Burdened </p>	
--	--

Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
3.3.4 -- KRS to B-4											
				\$295,534	\$0	\$295,534			\$0	\$59,106	\$354,641
3.3.4.1	SC: Delayed Pulling Cables	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
3.3.4.2	Install Switch in KRS	3d	BTEV.FNAL.MANDS. BASE,32977;BTEV.MANDS,32977	\$38,253	\$0	\$38,253	0%	20%	\$0	\$7,650	\$45,903
3.3.4.3	Pull Cable KRS to E2	10d	BTEV.MANDS,32977;BTEV.FNAL. MANDS.BASE,32977	\$38,253	\$0	\$38,253	0%	20%	\$0	\$7,650	\$45,903
3.3.4.4	Pull Cable E2 to E-0	5d	BTEV.MANDS,32977;BTEV.FNAL. MANDS.BASE,32977	\$38,253	\$0	\$38,253	0%	20%	\$0	\$7,650	\$45,903
3.3.4.5	Pull Cable E-0 to C-2	4d	BTEV.FNAL.MANDS. BASE,32977;BTEV.MANDS,32977	\$38,253	\$0	\$38,253	0%	20%	\$0	\$7,650	\$45,903
3.3.4.6	Pull Cable C-2 to C-0	3d	BTEV.MANDS,20477;BTEV.FNAL. MANDS.BASE,20477	\$23,753	\$0	\$23,753	0%	20%	\$0	\$4,750	\$28,503
3.3.4.7	Pull Cable C-0 to B-4	2d	BTEV.FNAL.MANDS. BASE,20477;BTEV.MANDS,20477	\$23,753	\$0	\$23,753	0%	20%	\$0	\$4,750	\$28,503
3.3.4.8	Fire wrap E-2, E-0, D-2	14d	BTEV.MANDS,20477;BTEV.FNAL. MANDS.BASE,20477	\$23,753	\$0	\$23,753	0%	20%	\$0	\$4,750	\$28,503
3.3.4.9	Fire wrap C-4, C-2, B-4	12d	BTEV.MANDS,20477;BTEV.FNAL. MANDS.BASE,20477	\$23,753	\$0	\$23,753	0%	20%	\$0	\$4,750	\$28,503
3.3.4.10	Terminate in 4 way switch	2d	BTEV.MANDS,20477;BTEV.FNAL. MANDS.BASE,20477	\$23,753	\$0	\$23,753	0%	20%	\$0	\$4,750	\$28,503
3.3.4.11	Splice to Feeder 49	2d	BTEV.MANDS,10239;BTEV.FNAL. MANDS.BASE,10239	\$11,877	\$0	\$11,877	0%	20%	\$0	\$2,375	\$14,252
3.3.4.12	Test Cables	2d	BTEV.MANDS,10239;BTEV.FNAL. MANDS.BASE,10239	\$11,877	\$0	\$11,877	0%	20%	\$0	\$2,375	\$14,252
3.3.5 -- IR Primary Power											
				\$241,654	\$0	\$241,654			\$0	\$48,330	\$289,985
3.3.5.1	SC: Delayed Start of IR	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
3.3.5.2	Install Duct Bank B-4	10d	BTEV.FNAL.MANDS. BASE,38032;BTEV.MANDS,38032	\$44,117	\$0	\$44,117	0%	20%	\$0	\$8,823	\$52,940
3.3.5.3	Install Duct Bank C-0	10d	BTEV.FNAL.MANDS. BASE,57418;BTEV.MANDS,57418	\$66,604	\$0	\$66,604	0%	20%	\$0	\$13,320	\$79,925
3.3.5.4	Install Duct Bank C-1	10d	BTEV.FNAL.MANDS. BASE,30551;BTEV.MANDS,30551	\$35,439	\$0	\$35,439	0%	20%	\$0	\$7,087	\$42,526
3.3.5.5	Install Transformer Pad B-4	5d	BTEV.MANDS,9878;BTEV.FNAL. MANDS.BASE,9878	\$11,458	\$0	\$11,458	0%	20%	\$0	\$2,291	\$13,750
3.3.5.6	Install Transformer Pad C-0	14d	BTEV.FNAL.MANDS. BASE,27166;BTEV.MANDS,27166	\$31,512	\$0	\$31,512	0%	20%	\$0	\$6,302	\$37,815
3.3.5.7	Install Transformer Pad C-1	5d	BTEV.MANDS,9878;BTEV.FNAL. MANDS.BASE,9878	\$11,458	\$0	\$11,458	0%	20%	\$0	\$2,291	\$13,750
3.3.5.8	Install Transformer B-4	4d	BTEV.FNAL.MANDS. BASE,6000;BTEV.MANDS,6000	\$6,960	\$0	\$6,960	0%	20%	\$0	\$1,392	\$8,352

BTeV - WBS 3.0 C0 Building Outfitting												
Total Construction Obligations (FY05\$)												
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead												
Non-Fermilab Labor: Salary, Benefits & Overhead												
Material Burdened												
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)	
3.3.5.9	Install Transformer C-0	4d	BTEV.FNAL.MANDS.BASE,12000;BTEV.MANDS,12000	\$13,920	\$0	\$13,920	0%	20%	\$0	\$2,784	\$16,704	
3.3.5.10	Install Transformer C-1	4d	BTEV.FNAL.MANDS.BASE,6000;BTEV.MANDS,6000	\$6,960	\$0	\$6,960	0%	20%	\$0	\$1,392	\$8,352	
3.3.5.11	Install Panel boards	20d	BTEV.MANDS,11400;BTEV.FNAL.MANDS.BASE,11400	\$13,224	\$0	\$13,224	0%	20%	\$0	\$2,644	\$15,868	
3.3.5.12	Pull 13.8 KV Primary, splice and wrap B-4	7d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.13	Pull 13.8 KV Primary, splice and wrap C-0	7d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.14	Pull 13.8 KV Primary, splice and wrap C-1	7d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.15	Pull and terminate secondary	5d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.16	Clean Transformers	3d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.17	Testing	3d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.18	Punch List	10d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0	
3.3.5.19	C Sector H V Ready By	1d		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
4 -- Pre Procured Items												
				\$625,337	\$38,347	\$663,684			\$7,669	\$125,067	\$796,421	
4.1 -- Procure Item EDIA FESS												
				\$0	\$38,347	\$38,347			\$7,669	\$0	\$46,016	
				\$0	\$38,347	\$38,347			\$7,669	\$0	\$46,016	
4.1	Procure Item EDIA FESS	21d	BTEV.FNAL.FESS.EE,455	\$0	\$38,347	\$38,347	20%	0%	\$7,669	\$0	\$46,016	
4.2 -- Write procured item specs												
				\$0	\$0	\$0			\$0	\$0	\$0	
				\$0	\$0	\$0			\$0	\$0	\$0	
4.2	Write procured item specs	30d		\$0	\$0	\$0	0%	18%	\$0	\$0	\$0	
4.3 -- SC: Delay RFP's												
				\$0	\$0	\$0			\$0	\$0	\$0	
				\$0	\$0	\$0			\$0	\$0	\$0	
4.3	SC: Delay RFP's	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0	
4.4 -- Bid and award cable												
				\$0	\$0	\$0			\$0	\$0	\$0	
				\$0	\$0	\$0			\$0	\$0	\$0	
4.4	Bid and award cable	42d		\$0	\$0	\$0	0%	18%	\$0	\$0	\$0	
4.5 -- Phase 1 Cable Procure and delivery												
				\$16,441	\$0	\$16,441			\$0	\$3,288	\$19,730	
				\$16,441	\$0	\$16,441			\$0	\$3,288	\$19,730	
4.5	Phase 1 Cable Procure and delivery	80d	BTEV.MANDS,14174;BTEV.FNAL.MANDS.BASE,14174	\$16,441	\$0	\$16,441	0%	20%	\$0	\$3,288	\$19,730	
4.6 -- C Sector Cable procure and delivery												

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
				\$246,617	\$0	\$246,617			\$0	\$49,323	\$295,940
				\$246,617	\$0	\$246,617			\$0	\$49,323	\$295,940
4.6	C Sector Cable procure and delivery	119d	BTEV.FNAL.MANDS.BASE,212601;BTEV.MANDS,212601	\$246,617	\$0	\$246,617	0%	20%	\$0	\$49,323	\$295,940
4.7 -- Bid and award transformers											
				\$0	\$0	\$0			\$0	\$0	\$0
				\$0	\$0	\$0			\$0	\$0	\$0
4.7	Bid and award transformers	42d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
4.8 -- Phase 1 Transformer Procure and Deliver											
				\$61,480	\$0	\$61,480			\$0	\$12,296	\$73,776
				\$61,480	\$0	\$61,480			\$0	\$12,296	\$73,776
4.8	Phase 1 Transformer Procure and Deliver	95d	BTEV.MANDS,53000;BTEV.FNAL.MANDS.BASE,53000	\$61,480	\$0	\$61,480	0%	20%	\$0	\$12,296	\$73,776
4.9 -- C SectorTrans. procure and delivery											
				\$242,440	\$0	\$242,440			\$0	\$48,488	\$290,928
				\$242,440	\$0	\$242,440			\$0	\$48,488	\$290,928
4.9	C SectorTrans. procure and delivery	105d	BTEV.MANDS,209000;BTEV.FNAL.MANDS.BASE,209000	\$242,440	\$0	\$242,440	0%	20%	\$0	\$48,488	\$290,928
4.10 -- Bid and award Air switch											
				\$0	\$0	\$0			\$0	\$0	\$0
				\$0	\$0	\$0			\$0	\$0	\$0
4.10	Bid and award Air switch	42d		\$0	\$0	\$0	0%	20%	\$0	\$0	\$0
4.11 -- Phase 1 4-Bay Switch Procure and Delivery											
				\$29,179	\$0	\$29,179			\$0	\$5,835	\$35,015
				\$29,179	\$0	\$29,179			\$0	\$5,835	\$35,015
4.11	Phase 1 4-Bay Switch Procure and Delivery	75d	BTEV.MANDS,25155;BTEV.FNAL.MANDS.BASE,25155	\$29,179	\$0	\$29,179	0%	20%	\$0	\$5,835	\$35,015
4.12 -- C Sector 4-Bay Switch procure and delivery											
				\$29,178	\$0	\$29,178			\$0	\$5,835	\$35,014
				\$29,178	\$0	\$29,178			\$0	\$5,835	\$35,014
4.12	C Sector 4-Bay Switch procure and delivery	75d	BTEV.MANDS,25154;BTEV.FNAL.MANDS.BASE,25154	\$29,178	\$0	\$29,178	0%	20%	\$0	\$5,835	\$35,014
5 -- CDR, ACDR, & Project Reviews											
				\$0	\$57,984	\$57,984			\$0	\$0	\$57,984
5.3 -- FY05 Fess Engineering											
				\$0	\$57,984	\$57,984			\$0	\$0	\$57,984
				\$0	\$57,984	\$57,984			\$0	\$0	\$57,984
5.3	FY05 Fess Engineering	108d	BTEV.FNAL.FESS.EE,688	\$0	\$57,984	\$57,984	0%	0%	\$0	\$0	\$57,984

Material Burdened

BTeV - WBS 3.0 C0 Building Outfitting											
Total Construction Obligations (FY05\$)											
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead											
Non-Fermilab Labor: Salary, Benefits & Overhead											
Material Burdened											
Activity ID	Activity Description	Duration	Labor and Material & Services Resource Information	Material & Services Cost	Labor Cost	Base Budget	Labor Contingency (%)	Materials & Services Contingency (%)	Labor Contingency (\$)	Materials & Services Contingency (\$)	Total Budget (Base + Contingency)
				\$0	\$0	\$0			\$0	\$0	\$0
6.2.1.2	T0M: CD-1 Approve Preliminary Baseline Range	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.1.3	T0M: CD-2 Approve Performance Baseline	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.1.4	T0M: CD-3a Approve Limited Construction	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.1.5	T0M: CD-3b Approve Start of Construction	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.1.6	T0M: CD-4 Approve Start of Ops - Project Closeout	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.2 -- Tier 1DOE Headquarters Milestones											
				\$0	\$0	\$0			\$0	\$0	\$0
6.2.2.1	T1M-2: Occupancy: C0 low lvl, upper staging area	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.3 -- Tier 2 DOE Chicago Milestones											
				\$0	\$0	\$0			\$0	\$0	\$0
6.2.3.1	T2M-23: Start C0 Outfitting construction	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.3.2	T2M-24: Occupancy: C0 low lvl, upper staging area	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.3.3	T2M-25: C0 Outfitting construction complete	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.4 -- Tier 3 Fermilab Directorate, BTeV Mgnt. Milestones											
				\$0	\$0	\$0			\$0	\$0	\$0
6.2.4.1	T3M-84: Start C0 Outfitting construction	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.4.2	T3M-85: Occupancy: C0 low lvl, upper staging area	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.4.3	T3M-86: Collision Hall completed	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
6.2.4.4	T3M-87: Assy, Service Bldg construction completed	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
7 -- EarlyTarget Ready By Dates											
				\$0	\$0	\$0			\$0	\$0	\$0
7.1 -- T5M: MS-1 Start Engineering											
				\$0	\$0	\$0			\$0	\$0	\$0
				\$0	\$0	\$0			\$0	\$0	\$0
7.1	T5M: MS-1 Start Engineering	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
7.2 -- T4M: MS-2 Start Construction											
				\$0	\$0	\$0			\$0	\$0	\$0
				\$0	\$0	\$0			\$0	\$0	\$0
7.2	T4M: MS-2 Start Construction	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
7.3 -- T5M: MS-3 Side Bay. Struct. Complete											
				\$0	\$0	\$0			\$0	\$0	\$0
				\$0	\$0	\$0			\$0	\$0	\$0
7.3	T5M: MS-3 Side Bay. Struct. Complete	0		\$0	\$0	\$0	0%	0%	\$0	\$0	\$0
7.4 -- T5M: MS-4 Temo Power Operational (Fdr 45)											
				\$0	\$0	\$0			\$0	\$0	\$0
				\$0	\$0	\$0			\$0	\$0	\$0

Material Burdened

WBS3_0

WBS DEFINITIONS / BASIS OF ESTIMATE

C-0 Outfitting

Section
XII

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1	C-0 Outfitting Phase 1					
1.1	Design to Award C-0 Phase 1					
1.1.1	SC: Delay Proj. Start					
1.1.2	Title II EDIA FESS Phase 1	FESS Engineering, an enginnering group within the Facilities Engineering Services Section (FESS) of Fermilab will produce the required engineering, drawing and specifications required for the bid doucuments. All aspect of the design will be accomplished or overseen by engineers licensed in the state of Illinois.				
1.1.3	Title II EDIA Consultant Phase 1	Electrical enginnering will be accomplished by a consultant engineer. Fire protection and fire detection will have an independant review by a consultant Fire Protection Engineer.				
1.1.4	Construction Req.					
1.1.5	Release for Bid					
1.1.6	Pre-Bid Meeting					
1.1.7	Establish Source Criteria					
1.1.8	Receive Proposals					
1.1.9	Source Selection & Award					
1.2	Title 3 EDIA C-0 Outfitting Phase 1					
1.2.1	Engineering Effort			FESS Engineering and consutant engineering	Title III estimate is based on the DOE guidline of 11% of construction costs.	
1.2.2	Work Force Safety Promotions					
1.3	C-0 Outfitting Phase 1 Construction Contract	C-0 Outfitting Phase 1 will construct those components required to build and test the analysis magnet, torroids and emcal. The work includes the construction of the mezzinine floor slabs, all concrete block and drywall partitions, the toilet rooms, fire protection for all constructed spaces, fire detection of all constructed spaces and the primary and secondary power required for the detectors high voltage power supplies.	C-0 Outfitting Phase 1 will be a fixed price contract based on competetive proposals. The award of the contract will be based on price, safety qualifications, understanding of schedule requirements and qualifications and experience of key personnel.	Base unit costs for construction items include the overhead and profit for sub-contractors. Dollars shown in the basis of estimate included 2.9% escalation from the base FY04 dollars to FY05 dollars. Dollars shown in the projects cost profiles include 20% general overhead and profit over and above the dollars shown below.		*
1.3.1	SC: Delayed Const. Start					
1.3.2	Notice to Proceed			NA		
1.3.3	Mobilize	Provides for site preparation including contractor trailer setup (not paid for as line item), installation of silt fence, and survey work including field measurements of existing conditions.		Mobilize/Survey 1Lot@\$10,290=\$10,290 Erosion Control 1Lot @ \$2,058=\$2,058 IEPA Permits 1Yr. @ \$1,000=\$1,000		
1.3.4	Site Concrete					
1.3.4.1	S & A Concrete Mix			NA		
1.3.4.2	S & A Rebar			NA		
1.3.4.3	FBP Foundations at Stair			Stair concrete walls and footing 8.33 CY @\$400 = \$3,333 Stair Slab 4.9 CY @ \$350= \$1,729		
1.3.4.4	Construct Hardstands	Stone hardstands for exterior staging and storage and around outside equipment.		Strip Topsoil 207CY @\$12=\$2,484 12" CA-1 + 6" CA-6 150CY@\$31=\$4650 Dewar Pad 1Lot @\$3,087=\$3,087		
1.3.4.5	Site Utilities			ICW (Relocate PIV) 1Lot@\$4,000=\$4,000		

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

Activity ID	Activity Description	WBS_Dictionary [Note Category]	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.4.6	Rework Temp Power					
1.3.4.7	Demo Int. Stair Enclosure	Provides for the labor and materials to remove and dispose of the drywall patitions that were constructed around stair # 1		Remove/Dispose Temp Partitions 1Lot@\$2,573=\$2,573		
1.3.5	Structural Steel & Weather Enclosures					
1.3.5.1	S & A Steel Shop Drawings					
1.3.5.2	Fab and ship Steel					
1.3.5.3	Mezzanine Structural Steel	Provides for the labor, materials, equipment to supply and erect structural steel columns, girders and beams for the mezzanines between column lines F and G at elevations 754 and 764. Includes allotment for connections and miscellaneous steel framing.	Preliminary steel sizes were caluculated and quantity take offs were made based on the plans.	(Mezz Structural Steel \$47,252) Stl. Columns W8x31 x 21'-6" 0.4tons@\$2,675=\$1,070 Girders W12 x 136 x 25' x 6 10.2tons@\$2,058=\$20,992 Girders W12 x 87 x 25' x 6 6.5tons@\$2,058=\$13,377 Beam Clips 21 X 4 84Ea@\$2=\$1,729 Girder Mounting Brackets 8 x 2 16Ea@\$309=\$4,939 Misc. Steel 1lot@\$5,145=\$5,145		*
1.3.5.4	Structural Steel at Stair #3	Provides for the labor, materials, amd equipment to supply and erect the structural steel columns, girders, beams, and girts in the stair #3 area bounded by column lines G-J. Includes framing mezzanine and roof framing. Beams on column line G included in 1.3.5.3	Preliminary steel sizes were caluculated and quantity take offs were made based on the plans.	Stl Colums W12 x 58 x 29.5' x 2 =.8 tons x \$2600 = @2080 Girders W16 x32 x 25' x 2 =1.55 tons @ \$2,000 per ton = \$3100 Beams W 16 x 31 x 25' x 6 =1.95 tons @\$200 = \$3900 Beams clips @ \$725 Misc Steel @ \$2000 Added Floor beams 1.3 tons @ 2000 = \$2600		
1.3.5.5	Install Steel Stairs and misc.	Provides for the labor, materials and equipment to supply and erect the metal pan stairs. Includes the landing and concrete fill of the pans as well and miscellaneous steel attachments and framing angles. Also includes ornament metals for rails at the equipment access doors at elevation 731	Based on Means from quantity take off of the drawings.	(Stair Enclosure and Misc. Steel \$30,186) Stair enclosure columns W8 x 31 x 29'-6" x 4 1.9tons@\$2,675=\$5,083 Wall purlins C 8 x 11.5 x 32' x 4 0.8tons@\$2,881=\$2,305 Stair Enclosure Roof Beam W8 x 21 x 48' 0.6tons@ \$2,573=\$1,544 Roof Floor Angles L5x3 @t# x 32" x 2 0.3tons@ \$3,087=\$926 Stair enclosure Roof Deck 8' x 16' 128SF@\$2=\$263 Removable Rail @ Door , 8' Lg 1lot@\$309=\$309 (High Bay Stairway 3'-6" W, 18+16 Risers) 34Risers@\$154=\$5,248 New Side Stair 34 Risers@\$154=\$5,248 Landings 4'x 7'-6" x4 120SF@\$77=\$9,261		
1.3.5.6	Siding & Roofing	Provides for the labor, materials, and equipment to supply and erect the metal siding including the liner panel, subgirts, insulation and face panel at the stair #2 area		(Roofing and Siding \$77,980) Roofing at stair #2 625sf @ \$5 - \$3125 Roofing @ elevator 100sf @\$5 = \$500 Blocking and flashing 75lf @ \$1 = \$1125 Siding 2400sf @ \$29 = \$69600 Flashing 140LF @ \$10=\$1400 Misc @ \$2230		*
1.3.6	Structural Concrete					*
1.3.6.1	S & A Rebar and Tendons.					
1.3.6.2	Fab Rebar and Tendons					
1.3.6.3	FBP Concrete @ El. 755'	Provides for the labor, materials, and equipment for the 8" post-tentioned, cast-in-place concrete slab. The slabs will clearspan between col. lines F, G and J. A performance specification will be written for the post-tentioning.		(Floor Deck El: 755-4)8" PT Concrete Slab 47.18CY@\$823=\$38,829 Edge angles 75LF@\$2=\$154 8" PT Concrete slab at stair #3 = \$ 8,768, includes edge angles		
1.3.6.4	FBP Concrete @ El 764'	Provides for the labor, materials, and equipment for the 8" post-tensioned, cast-in-place concrete slab. The slabs will clearspan between col. lines F, G and J. A performance specification will be written for the post-tensioning.		(Floor Deck El: 766-0) 8" PT Concrete Slab 47.Cy@\$823=\$38,829 Edge angles 75LF@\$2=\$154 8" Pt Concrete slab at Stair #3 = \$8,768 includes 50" of edge angle		

BTev - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.7	Concrete Masonry	Provides for the labor, materials and equipment to supply and erect concrete masonry partitions. Partitions are at a number of locations with in C-0, around the elevator and stairs, between the high bay and mezzanine and mechical room and toilet rooms. A value engineering study will examine if and where gypboard partiions can be used in place of the concrete masonry. If and where gypboard is used the cost will be less.	Means unit prices were used times quantity take offs from the plans.	C-0 Building (\$79,841) 8" Concrete Block 7626SF @\$9=\$67,486 6" Concrete Block 770SF @\$8=\$6,180 Scaffolding 1Lot@\$6,174=\$6,174 Also see activity 1.3.7.8.		*
1.3.7.1	S & A Masonry SD					
1.3.7.2	S & A Doors and Glass					
1.3.7.3	Concrete Masonry El 715-0			10% of 3.1.3.7 (\$79,841)		
1.3.7.4	Concrete Masonry El 731'-4			15% of 3.1.3.7 (\$79,841)		
1.3.7.5	Concrete Masonry El 746-6			25% of 3.1.3.7 (\$79,841) plus 616 sq of additional bloock at stair #3 and \$1000 of siding removal = \$ 6,543		
1.3.7.6	Concrete Masonry El 755-4			25% of 3.1.3.7 (\$79,841)		
1.3.7.7	Concrete Masonry El 766-0			25% of 3.1.3.7 (\$79,841)		
1.3.7.8	Install Doors and Glass	Provide materials, equipment and labor to supply and install hollow metal doors and frames. Cost include harware. Labeled doors will be used at all stairs and fire rated walls.		Doors and Windows \$28,678) H.M. Door, 3'x7' 12ea. @\$947=\$11,360 H.M. Door, Db1 6'x7' 1ea. @\$1,183=\$1,183 H.M. Door, DBL 8'x7' 1ea. @\$1,544=\$1,544 H.M. Framed Window, 3'x6' 9ea. @\$638=\$5,742 Access doors to mech. Shaft 4ea. @\$1,029= \$4,116 Areaway Encl. Walls @ Mech rm. 10'x10' 2ea @ \$2,367=\$4,733		*
1.3.8	Conveying System	Provide material, labor and equipment to supply and commercial hospital type hydraulic elevator between all main levels in the building.		(Elevators \$118,335) Elevator, Elect, 5000# 1Ea @ \$118,335= \$118,335 Maint. Contract 12 Months (included) Also see 1.3.8.5 & 1.3.8.6		*
1.3.8.1	S & A Elevator SD					
1.3.8.2	Fab and Del elev Rails					
1.3.8.3	Install elev rails			20% of 3.1.3.8 (\$118,335)		*
1.3.8.4	Install Elevator Machine Rm			40% of 3.1.3.8 (\$118,335)		
1.3.8.5	Demo Roof			Cut/Remove 2 roof Bms for Elevator 16 Hrs@ \$62=\$988		
1.3.8.6	Frame, Side & Roof Elevator Head house	This scope of work is required to provide for the code required elevator over-travel of the elevator. This work will be constructed as part of the structural steel, roofing, and metal siding installation.		New Roof Beams W8x15 x 56' 0.4tons@ \$3,087=\$1,235 Elevator Roof Deck 8' x 12' 96SF@ \$2=\$198 Misc. Steel @ Stair /Elevator 1lot@\$1,544=\$1,544 Siding for penthouse 4' x 40" 160SF@\$30=\$4,775		
1.3.8.7	Install Elevator Cab			40% of 3.1.3.8 (\$118,335)		
1.3.8.8	Energize and Test Elevator					
1.3.9	Finishes					
1.3.9.1	Paint Block Walls	Provides for the labor, materials and equipment to paint exposed block. Standard Fermilab color and finish will be used.		Paint Block Walls 11000SF@\$1=\$10,753 Mezz Struct Steel and Stairs (20 tons at 250 SF/ton) 5000SF@ \$1=\$4,800		*
1.3.9.2	Painting including Doors & Glass Frames	Provides for the labor, material and equipment to paint metal surfaces. Most exposed metal surfaces will be painted to provide corosion protection and a finished appearance. Standard Fermilab colors will be used.		Sprinkler Piping and Ductwork 1lot@ \$5,145=\$5,145 Doors & Window Frames 25Ea@ \$98=\$2,444 Misc. Painting 1lot@\$1,544=\$1,544		

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.9.3	Rough In Toilet Rm Plumbing	Provides the labor, materials and equipment to supply and install the water supply piping and sanitary drain piping for the toilet rooms and janitor closet. Also provides for the materials, labor and equipment for floor drains in under the computer floors		PLUMBING (50% of \$39,163) Mech room Floor Drain Piping 1LOT@\$8,232=\$8,232 Computer (1st Flr) Drain Piping 1LOT@ \$6,174=\$6,174Computer (3rd Flr) Drain Piping LOT@\$6,174=\$6,174 Water Closets 1LOT@ \$1,235=\$1,235 Urinal 1LOT@\$1,029=\$1,029 Lavatories 1LOT@ \$823=\$823 Mop Sink 1LOT@\$1,646=\$1,646 SS Counter Sink 1LOT@ \$823=\$823 Plumbing Piping 1LOT@ \$5,145=\$5,145 Misc @ \$7881		
1.3.9.4	Toilet RM Walls					
1.3.9.5	Toilet Rm Finishes					
1.3.9.6	Trim out Toilet Rm. Fixtures	Provides for the materials, labor and equipment to supply and install the plumbing fixtures in the toilet room and janitor closet		PLUMBING (50% of \$39,163) Mech room Floor Drain Piping 1LOT@ \$8,232=\$8,232 Computer (1st Flr) Drain Piping 1LOT@ \$6,174=\$6,174 Computer (3rd Flr) Drain Piping 1LOT@ \$6,174=\$6,174 Water Closets 1LOT@ \$1,235=\$1,235 Urinal 1LOT@ \$1,029=\$1,029 Lavatories 1LOT@ \$823=\$823 Mop Sink 1LOT@\$1,646= \$1,646 SS Counter Sink 1LOT@ \$823=\$823 Plumbing Piping 1LOT@ \$5,145=\$5,145 Misc. @ \$7,881		
1.3.9.7	Install Toilet Room Exhaust					
1.3.10	Fire Protection	Provides for the materials, labor and equipment to supply, install and test the sprinklers in the buildings. The sprinkler piping in the High Bay and the Collision H is currently installed and was tested with nitrogen. The ICW has been routed to the building under the UIP project.		Fire Protection (\$70055) El 746 Sprinkler 1925SF @\$8=\$15,847 El 755 Sprinkler 1925SF@ \$8=\$15,847 El 766 Sprinklers 1925SF @ \$8=\$15,847 Wet Sprinkler Riser 1LOT @\$7,203=\$7,203 Preaction Valving Assembly & Riser 1LOT @ \$13,377=\$13,377		*
1.3.10.1	SC: Delay Start of FP					
1.3.10.2	Install Fire Riser to High Bay			10 % OF 3.1.3.10 (\$70055)		
1.3.10.3	Install Fire Riser to Side bay			10 % OF 3.1.3.10 (\$70055)		
1.3.10.4	Rough In Sprinklers El 731'-4"			10 % OF 3.1.3.10 (\$70055)		
1.3.10.5	Rough In sprinklers El 746'-6			10 % OF 3.1.3.10 (\$70055) plus 425sf at stair #3 @ \$8. = \$3400		
1.3.10.6	Rough In Sprinklers El.755'-4			10 % OF 3.1.3.10 plus 437sf at stair #3 @ \$8. = \$3400		
1.3.10.7	Rough In Sprinklers El 766'-0			10 % OF 3.1.3.10 plus 437sf at stair #2 @ \$8. = \$3400 * 1.029 *1.2		
1.3.10.8	Trim Out Sprinklers El 731'-4"			10 % OF 3.1.3.10 (\$70055)		
1.3.10.9	Trim Out sprinklers El 746'-6			10 % OF 3.1.3.10 (\$70055)		
1.3.10.10	Trim Out Sprinklers El.755'-4			10 % OF 3.1.3.10 (\$70055)		
1.3.10.11	Trim Out Sprinklers El 766'-0			10 % OF 3.1.3.10 (\$70055)		

BTev - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information							
Activity ID	Activity Description	WBS_Dictionary Category	[Note	BoE: _Ground_Rules_ & _Assumptions [Note	BoE: Materials & Services [Note Category]	BoE: _Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.11	Fire Detection				Fire Detection (\$82,320) Test Hall El. 715 HSSD (Air Samp. Smoke Det.) 1lot @ \$15,435=\$15,435 Assy. Area El. 715 HSSD (Air Samp. Smoke Det.) 1lot @ \$15,435=\$15,435 Comp. Rm. El 746.5' Spot-type Smoke Det above Floor 6Ea @ \$515=\$3,087 Comp. Rm. El 746.5' Spot-type Smoke Det below Floor 6Ea @ \$515=\$3,08 2nd Floor Office El. 755'-4" Spot-type Smoke Det. 6Ea @ \$515=\$3,087 HD Comp. El. 766 Spot-type Smoke Det above floor 6Ea @ \$515=\$3,087 HD Comp. El. 766 Spot-type Smoke Det below floor 6Ea @ \$515=\$3,087 Fire Panel Upgrade 1Lo @ \$25,725=\$25,725 Firus upgrade conduit and wire 1Lot @ \$10,290=\$10,290 (See 1.3.14.2 for the 10% of thi cost applied to the Colliision Hall)		*
1.3.11.1	Fire Detection El 731'-4"				10% OF 3.1.3.11 (\$82,320)		
1.3.11.2	Fire Detection El 746'-6				20% OF 3.1.3.11 (\$82,320)		
1.3.11.3	Fire Detection El.755'-4				20% OF 3.1.3.11 (\$82,320)		
1.3.11.4	Fire Detection El 766'-0				20% OF 3.1.3.11 (\$82,320)		
1.3.11.5	Upgrade Fire Control Panel				10% OF 3.1.3.11 (\$82,320)		
1.3.11.6	Testl Fire Detection				10% OF 3.1.3.11 (\$82,320)		
1.3.12	Power Distribution and Lighting						
1.3.12.1	S & A Electrical Devices						

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

Activity ID	Activity Description	WBS_Dictionary [Note Category]	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.12.2	Rough In House Power El 715'-0	Includes materials, labor, and equipment to install the power to the Asemble Hall and Collision Hall. This includes the power to the power supplies located in the Assembly Hall. Includes system from and including the switchboard on to the final distribution point. Power distribution costs from exterior transformer to switchboard is in 1.3.13. Cost are split between the rough in and trim out efforts.	The electricl estimate was prepared by Hanson Engineering.	50% of the following items Power to Assembly Hall \$8,395 225 Amp Panel 1ea. @ \$4,809=\$4,809 250 MCM 3.75clf @ \$422=\$1,582 2 1/2 Inch Conduit 85lf @ \$24=\$2,004 Power to Collision Hall \$10,297 #4/0 AWG 11clf @ \$374=\$4,115 #6 Ground 3clf @ \$95=\$286 2 1/2 Inch Conduit 250lf. @ \$24=\$5,895 Power Supplies \$92,741 Switchboard for Power Supplies 2000 Amp Switchboar 1Ea. @ \$34,850 \$34,850 500 MCM Bare CU. Ground 3CLF @ \$450= \$1,349 Ground Bar 1LOT @ \$446=\$446 600 MCM 10CLF @ \$914=\$9,138 #3/0 Ground 3CLF @ \$321=\$962 4 Inch Conduit 240 FT @ \$43=\$10,201 350 MCM 10CLF @ \$526=\$5,257 #1 Ground 3CLF @ \$188=\$565 3 Inch Conduit 240FT @ \$32=\$7,698 1200 Amp Safety Switch 2EA @ \$6,528= \$13,056 600 Amp Safety Switch 2EA @ \$2,911=\$5,822 Power Supply Connections 4EA @ \$348=\$1,392 100 Amp Circuit Breaker Disconnect/Elev. 1ea. @ \$1,256=\$1,256 #2 AWG 1.5clf @ \$161=\$241 #8 AWG Ground 0.5clf @ \$208=\$104 1 1/4 Inch Conduit 35lf @ \$12= \$403 El 715 Power \$22,998 Motor Connections 1ea. @ \$402=\$402 20 Amp Disconnect for Elev. Lights 1ea. @ \$534=\$534 #10 AWG 2clf @ \$57=\$114 3/4 Inch Conduit 50lf @ \$8=\$394 2 Lamp Fluoresc. Lighting 15ea. @ \$246=\$3,692 #10 AWG 10.5clf @ \$57=\$598 3/4 Inch Conduit 200 lf @ \$8=\$1,576 Boxes 15 ea. @ \$27=\$398 Cover Plates 15ea @ \$12= \$184 Fixture Whips 15ea. @ \$77=\$1,151 20 Amp Duplex Receptacle 9ea. @ \$31=\$275 Boxes 9ea. @ \$27=\$239 Cover Plates 9ea. @ \$14=\$130 #10 AWG 22clf @ \$57=\$1,253 3/4 Inch Conduit 300lf @ \$8=\$2,363 60 Amp Weld Receptacle 4ea. @ \$858=\$3,432 #6 AWG 10clf @ \$96=\$965 #10 AWG 3.5clf @ \$57=\$199 1 Inch Conduit 225lf @ \$10=\$2,234 Reconnect Sump Pumps to Emerg. Panel 1lot @ \$2,864=\$2,864		

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

--

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.13.2	Install Duct bank B-4 to Berm			40 % of (\$89,246) High Voltage Terminations 15ea. @ \$446=\$6,690 5 Inch PVC Conduit 2400lf @ \$23=\$54,505 5 Inch RGS Elbows 24ea. @ \$345=\$8,278 3/4 Inch X 10 Ft. Ground Rods 10ea. @ \$191= \$1,910 Trench and Backfill 800lf @ \$4=\$3,583 High Pot Test Cables 1lot @ \$6,081=\$6,081 Concrete Pad 1ea. @ \$3,028=\$3,028 500 MCM Bare CU. Ground Cable 3clf @ \$390=\$1,171 plus \$4000		
1.3.13.3	Jack Carrier pipe thru berm			20% of \$89,246 = \$17,850		
1.3.13.4	Manhole	Supply and install power manhole		1 lot = \$17400		
1.3.13.5	Install duct bank berm to C-0 Pad			40 % of (489,246) High Voltage Terminations 15ea. @ \$446=\$6,690 5 Inch PVC Conduit 2400lf @ \$23=\$54,505 5 Inch RGS Elbows 24ea. @ \$345=\$8,278 3/4 Inch X 10 Ft. Ground Rods 10ea. @ \$191= \$1,910 Trench and Backfill 800lf @ \$4=\$3,583 High Pot Test Cables 1lot @ \$6,081=\$6,081 Concrete Pad 1ea. @ \$3,028=\$3,028 500 MCM Bare CU. Ground Cable 3clf @ \$390=\$1,171 plus \$4000		
1.3.13.6	Install secondary duct bank			500 MCM Bare CU Gnd. 3.5clf@ \$447=\$1,565 3/4 Inch X 10 Ft. Ground Rods 10ea. @ \$191=\$1,910 5 Inch PVC Conduit 1350lf @ \$16 =\$22,229 RGS Elbows 30ea. @ \$314=\$9,420 5 Inch Rgs Conduit 110lf @ \$63=\$6,916 Trench and Backfill 500lf @ \$4=\$1,973 750 MCM, 600 Volt 50.5clf @ \$1,000=\$50,519 350 MCM Neutral 14.5clf @ \$463= \$6,716 250 MCM Ground 8clf @ \$373= \$2,980 2/0 Ground 8clf @ \$233= \$1,867 Concrete 3yds. @ \$196= \$588 High Voltage Terminations 21 ea. @ \$372= \$7,815 High Pot Test Cables 1lot @ \$6,621= \$6,621 4/0, 15 KV Cable 3clf @ \$480=\$1,440 3 Inch Conduit 75lf. @ \$32=\$2,365		
1.3.13.7	Install Pad, C-0 Test Area			Oil Containment and Substation Pad \$44,710 Excavate / Backfill 1Lot @ \$2,058= \$2,058 Conc. Curb Wall 1' x 4'-3" x 158 25CY @ \$412= \$10,290 Conc. Pad 8" x 15' x 44'-3" 18 CY @ \$309= \$5,557 Grade Beam 3'7" x 2'-10" x 108 42CY \$206 = \$8,644 6" Clay Max Bed W/ Geotextile 4' x 138' 550SF @ \$5= \$2,830 Compacted Granular Fill 4'-7 x 11' x 50 100CY @ \$26= \$2,573 River Washed Gravel 3-9" x 4' x 136 80CY @ \$31 = \$2,470 Pad for Generator 1Lot @ \$10,290= \$10,290		
1.3.13.8	Install switch Pad at B-4					
1.3.13.9	Set switch at B-4			\$2000		
1.3.13.10	Set Transformers C-0			\$21,000		
1.3.13.11	Set Switch C-0 Test			\$2,000		
1.3.13.12	Set Generator C-0 Test			250 KW Generator 1ea. @ \$62,943=\$62,943		*

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
1.3.13.13	Pull Feeder B-4 to C-0 Test Area					
1.3.13.14	Terminate Primary					
1.3.13.15	Punch List (Excluding Elec.)					
1.3.13.16	Phase 1 Ben. Occ. Ready By					
1.3.13.17	Phase 1 Complete					
1.3.14	Phase 1 Coll. Hall					
1.3.14.1	Coll Hall Power	Provides for the materials, labor and equipment to supply and install the 120/208 V power panels and transformers for user power in the Collision Hall. Distribution will be by WBS 1.10		Power to Collision Hall \$18,497 400 Amp Panel 1ea. @ \$6,770=\$6,770 500 MCM 6.5clf @ \$665=\$4,322 3 1/2 Inch Conduit 200lf. @ \$37=\$7,405 Collision Hall \$57,702 200 Amp Disconnect Switch 1ea. @ \$817 = \$817 150 KVA Transformer 1ea. @ \$10,779= \$10,779 450 Amp Main Circuit Breaker Panelboard 1ea. @ \$7,450= \$7,450 #3/0 AWG 1clf @ \$311=\$311 #3 Ground 0.5clf @ \$122=\$61 2 Inch Conduit 15lf @ \$16= \$247 225 Amp Panelboard 4ea. @ \$4,897=\$19,589 #4/0 AWG 10clf @ \$372= \$3,719 #4 Ground 3clf @ \$122= \$367 2 1/2 Inch Conduit 230lf @ \$24 =\$5,424 60 Amp Weld Receptacle 4ea. @ \$682=\$2,729 #6 AWG 7clf @ \$95= \$668 #10 Ground 3clf @ \$57=\$171 1 Inch Conduit 200lf @ \$10= \$1,977 20 Amp Duplex Receptacles 6ea. @ \$26= \$154 Boxes and Cover Plates 6ea. @ \$39= \$231 #10 AWG 12clf @ \$57= \$683 3/4 Inch Conduit 300lf @ \$8= \$2,324		
1.3.14.2	Fire Detection Collision Hall			10% OF 3.1.3.11.1 (\$82,320)		
1.3.14.3	Rerack Main Ring Manholes	This effort may be T&M to be accomplished during a beam shutdown, therefore G&A has been included		6 manholes at 2500@ \$15,000		
2	C-0 Outfitting Phase 2					
2.1	Design to Award C-0 Phase 2					
2.1.1	SC: Delayed Start of Eng.					
2.1.2	Title II EDIA FESS				Title 2 based on 10% of construction estimate. This is FESS Engineering's budget with a portion of the total going to 2.1.3	
2.1.3	Title II EDIA Consultant			A portion of 2.1.2		
2.1.4	Construction Req.					
2.1.5	Release for Bid					
2.1.6	Pre- Bid Meeting					
2.1.7	Establish Source Criteria					
2.1.8	Receive Proposals					
2.1.9	Source Selection& Award					
2.2	Title 3 EDIA C-0 Outfitting Phase 2					

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

Activity ID	Activity Description	WBS_Dictionary Category]	[Note	BoE: _Ground_Rules_ & Assumptions [Note	BoE: Materials & Services [Note Category]	BoE: _Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.2.1	Engineering Effort					Title 3 engineering based on 11% of construction estimate.	
2.2.2	Work Force Safety Promotions						
2.3	C-0 Outfitting Phase 2 Construction Contract	The C-0 Outfitting Phase 2 will complete the work in and around the C-0 building required to build and operate the BTeV detector. The work includes but is not limited to primary power and power distribution for building house power and trigger computing power. Also included are the cooling and HVAC systems for the Collision Hall, High Bay and mezzanine floors. Raised access floors, including underfloor sprinklers, carpeting and other floor and wall finishes, and lighting. Site features include dewar pads and construction of the gas house. Architectural rework of the main Ring Service Building will also be accomplished in this contract.		C-0 Outfitting Phase 2 will be a fixed price contract based on competitive proposals. The award of the contract will be based on price, safety qualifications, understanding of schedule requirements and qualifications and experience of key personnel.			
2.3.1	SC: Delayed Start of Construction						
2.3.2	Notice to Proceed						
2.3.3	Mobilize						
2.3.4	Site Concrete						
2.3.4.1	FBP Chiller Pads				Chiller and Mech Pads 5 Ea @ \$4,939 = \$24,695		
2.3.4.2	FBP Condenser Pads				1 Lot @ \$37,044		
2.3.4.3	Construct Gas House				Gas Mixing Shed 8'x12' 96SF @ \$80= \$7,680 Gas Shed Foundation & Slab 1Lot@ \$6,586= \$6,586 Electric Heaters 1E @ \$3,087= \$3,087 Lighting and outlets 1Lot @ \$2,815= \$2,815		
2.3.5	Masonry						
2.3.5.1	S & A Finishes						
2.3.5.2	C-0 Service Bldg. Mods	Provides for the materials, equipment and labor to supply and install the masonry walls in the C-0 Service Building. Also includes the required demolition of existing walls. Creates the space required for the power supplies.			1 Lot @ \$8,425		
2.3.5.3	C-0 SB Buss Duct Enclosure	Provides the materials, labor and equipment to supply and install a heated enclosure and primary structural supports for the WBS 2.0 power bus for the C-0 Service building to the existing penetrations to the Tevatron tunnel.			Structural Supports @ \$5,000 Enclosure @ \$20,000 Fan unit @ \$298		
2.3.6	Finishes	Provides for the materials, equipment and labor to supply and install the floor finishes in the Mezzanine. There is tile in the toilet rooms, and carpet in the mid level office/tech floor. The upper and lower mezzanine floor receives 24" high raised access computer floor. The floor is electrical ground isolated from the building with G-10 and has a copper ground grid on 48" centers.					
2.3.6.1	Fab and Deliver Finishes						

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.6.2	Flooring & Carpeting El 755'-4			(Flooring and Carpets \$11,880) Vinyl Floor Tile @ all Interior Stairs 280SF@ \$4=\$1,080 Vinyl Tile @ Stair Threads 1' x4' 34Ea @ \$31=\$1,050 Carpeting @ offices 150SY @ \$28=\$4,167 Ceramic Floor Tile @ El. 757 Toilet 16' x 16' 250SF @ \$8=\$2,109 Counter W/ Base Cabinets 5LF @ \$180=\$900 Misc Trim and Finishes 1lot @ \$2,573=\$2,573		*
2.3.6.3	Install Computer Floor El 746'-6			(Specialties 50% OF \$104,659) Computer Floor 2' High (elev 746'-6") 1120SF@ \$31=\$34,574 Computer Floor 2' High (approx 760'-0") 1850 SF @ \$31=\$57,110 Misc Trim and Cut Outs 1lot @ \$4,116=\$4,116 Isolate Computer Floor from Building 1lot@ \$4,116=\$4,116 Ground Grid 3073SF@\$2=\$4,743		*
2.3.6.4	Install Computer Floor El. 766'-0			(Specialties 50% OF\$104,659) Computer Floor 2' High (elev 746'-6") 1120SF@ \$31= \$34,574 Computer Floor 2' High (approx 760'-0") 1850 SF@ \$31=\$57,110 Misc Trim and Cut Outs 1lot@ \$4,116=\$4,116 Isolate Computer Floor from Building 1lot@ \$4,116= \$4,116 Ground Grid 3073SF@ \$2=\$4,743		*
2.3.6.5	C-0 Service Bldg. Mods			(C-0 Service Building \$42,580) Remove and relocate HVAC unit C-0 SB 1 Lot \$5,145= \$5,145 Remove electric unit heater C-0 SB 32HR@\$67= \$2,140 Lift for mechanical demo work C-0 SB 1LOT@\$515=\$515 Misc Ceiling/Lighting /Mech Mods C-0 SB 1200SF@\$10=\$12,348 Electrical Mods C-0 SB 1200SF@ \$12=\$14,818 Floor Modification C-0 SB 1200SF@\$2 =\$2,470 Exhaust Fans 2 EA@\$2,058= \$4,116 Motorized Dampers 1EA @\$1,029=\$1,029		
2.3.7	HVAC System			AIR (HVAC) SYSTEM (\$311,141)		*
2.3.7.1	S & A HVAC Units					
2.3.7.2	F & D HVAC Units					
2.3.7.3	SC: Delayed HVAC Start					
2.3.7.4	Install HVAC Units Coll. Hall & Assem Hall	Provide for labor, materials and equipment to install HVAC units at Mechanical room to serve the collision hall and assembly hall		AHU for collision and assembly hall 2EA @\$25,725=\$51,450; 50% of AHU installation 50% of 4EA@#3,087=\$6,174		
2.3.7.5	Install HVAC Units + Off & MUA	Provide for labor, materials and equipment to install HVAC units at Mechanical room to serve the Office area		Make up air unit 1EA@\$8,618=\$8,618; AHU for office 1EA@10,290=\$10,290; 50% of AHU installation 50% of 4EA@\$3,087=\$6,174		
2.3.7.6	Duct Work	Provide for labor, materials and equipment to install HVAC ductwork and related accessories at mechanical room, including smoke detector. This also include the leak testing of the purge ductwork.		Airhandler Plenum& Transitions 1LOT@\$15,435=\$15,435; Mech Room Ductwork 1LOT@\$36,015=\$36,015; Smoke Duct Detecor 2EA@\$527=\$1,053; 75% of Leak testing of system 75% of 1LOT@\$1072=\$804; 50% of Scaffolding 50% of 1LOT@\$4,116=\$2,058		
2.3.7.7	Install Ductwk El 755'-4"	Provide for labor, materials and equipment to install & route HVAC ductwork from mechanical room to the office area		Ductwork to 2nd flr 1LOT@\$10,290=\$10,290		
2.3.7.8	Install Motorized Dampers and Louvers	Provide for labor, materials and equipment to install HVAC dampers and louvers at the mechanical room		Motorized dampers 20EA@515=\$10,290		
2.3.7.9	Install Purge and return fan	Provide for labor, materials and equipment to install purge and return fans at ductwork in the mechanical room		Purge Return Fans 2EA@\$7,718=\$15,435		

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.7.10	Insulate Ductwork	Provide for labor, materials and equipment to insulate ductwork		Insulate ductiwork 1LOT@\$30,870=\$30,870		
2.3.7.12	Install Mech Room Exhaust	Provide for labor, materials and equipment to install HVAC exhaust unit		Humdifier for Airhandler 1LOT@\$9,261=\$9,261; Domestic water to Humdifier 1LOT@\$3,087=\$3,087		
2.3.7.13	Install DCW pipe and Humidifier	Provide for labor, materials and equipment to install and route domestic water piping to the unit humidifier		Humdifier for Airhandler 1LOT@\$9,261=\$9,261; Domestic water to Humdifier 1LOT@\$3,087=\$3,087		
2.3.7.14	Balance HVAC System, Assy, Off & MUA	Provide for labor, materials and equipment to do testing, adjusting and balancing of airflow for the various HVAC unit		70% of Balancing 70% of 1LOT@\$6,790=\$4,753		
2.3.7.15	Install Sensors and Controls	Provide for labor, materials and equipment to install HVAC related sensors and controls		70% of controls 70% of 1LOT@\$69,458=\$48,621		*
2.3.7.16	Start Up and Comm (Non Shutdownwn Related)	Provide for labor, materials and equipment to install startup HVAC system		15% of controls 15% of 1LOT@\$69,458=\$10,419; 50% of startup/commissioning 50% of 1LOT@\$11,237=\$5,618		
2.3.7.17	Install CRAC Condensing Unit AC for EI 746	Provide for labor, materials and equipment to install hvac unit at the 1st floor, associated condensing unit outside the building		Cooling unit for the 1st flr 1EA@\$13,933=\$13,933		
2.3.7.18	Install Ref Piping Test, Fill and Charge Ins and Startup	Provide for labor, materials and equipment to install refrigerant piping including testing, charging, filling, and insulating and startup of the 1st floor HVAC unit.		Refrigerant piping 1LOT@\$2,058=\$2,058; Insulation for refrigerant piping 1LOT@\$3,023=\$3,023; 25% of leak test system 25% of 1LOT@ 1072=\$268		
2.3.8	Chilled Water System (CHW)			CHW (\$259,462) AIR Cooled Rotary Chiller _140_Ton 1EA @ \$92,013=\$92,013 chw pumps, 1EA @ \$4000= \$4000 Air separator 1EA @ \$1,029=\$1,029 Strainers 2EA @ \$2,100=\$4,200 Triple Duty Valve 1EA @ \$1000=\$1000 4" Tee 8EA @\$545=\$4360 4" Elbow 22EA @ \$330=\$7260 4" Butterfly Valve 10EA@ \$595=\$5950 Weld Neck Flange 4" 20EA @ \$186=\$3720 1-1/2" or 2" Ball Valve 12EA @ \$69=\$827 Elbows 2-1/2" or 2" 12EA@ \$122=\$1,469 insulation 2" 100LF@ \$8=\$823 ecw piPE hEADER WITH NO VALVES LOT @ 22,179=\$22719 Suction Diffuser 4" 1EA@ \$1152=\$1,152 Flexible connector 4" 2EA @ \$283=\$566 4" carbon steel 425 LF @ \$70=\$29750 expansion tank 1EA @ \$2,624=\$2,624 Chiller Commissioning Testing Support 32HR @ \$67= \$2,140 Insulation for 4" Piping 1-1/2" thk, 425LF @ \$11=\$4463 CONTROLS/ddc 1 LOT @ \$59,039 equipment insulation (Tank, Pump) 1LOT @ \$2778=\$2778 supports 1LOT @ \$1852 =\$1852 Flushing, Filling, Tag 1LOT@ \$1,029=\$1,029 Glycol System + install 1LOT @ \$2,058= \$2,058 Misc Fittings, gauges 1LOT @ \$1,029= \$1,029 Balanceing 4 days @ \$679=\$2716 testing Hydro 16HR @ \$67=\$1,070		*
2.3.8.1	S & A Chillers, W/ Controls					
2.3.8.2	F & D Chillers W/ Controls					
2.3.8.3	S & A Chilled Water Pumps					
2.3.8.4	F & D Chilled Water Pumps					
2.3.8.5	SC: Delayed Chiller Equip.					
2.3.8.6	Install Chillers	Provide for labor, materials and equipment to install outdoor chiller		chiller 1EA@\$92,013=\$92,013		

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.8.7	Install Chilled Water Pumps	Provide for labor, materials and equipment to install chilled water pumps in the mechanical room		1.36% of 2.3.8 (\$259,462)		
2.3.8.8	Install CHW piping supports and Fittings	Provide for labor, materials and equipment to install chilled water piping, including supports and fittings		14.3% of 2.3.8 (\$259,462)		
2.3.8.9	Install Tanks and Other Hydronic items	Provide for labor, materials and equipment to install hydronic items such as expansion tanks, valves, etc		3.56% of 2.3.8 (\$259,462)		
2.3.8.10	Install ECW pipe header on 746 Comp Rm.	Provide for labor, materials and equipment to install ECW (electronic water system) pipe header in the 1st floor underfloor.		5.49% of 2.3.8 (\$259,462)		
2.3.8.11	ECP -02 Trigger Add. CHW	This is an item that increase the size of chilled water piping and the ECW pipe header and related hydronic items due to the increase in equipment heat load that affected the whole chilled water system		9.72% of 2.3.8 (\$259,462)		
2.3.8.12	Leak test and Insulate ECW Header	Provide for labor, materials and equipment to do a hydrostatic test on the ECW pipe header and to flush and insulate afterwards.		1.83% of 2.3.8 (\$259,462)		
2.3.8.13	Leak test & Insulate CHW	Provide for labor, materials and equipment to do a hydrostatic test on the chilled water piping system and to insulate afterwards		3.07% of 2.3.8 (\$259,462)		
2.3.8.14	Install Sensors and Controls	Provide for labor, materials and equipment to install chilled water related sensors and controls		70% of controls 70% of 1LOT@\$59,039=\$41,327		*
2.3.8.15	Flush tag and Fill System	Provide for labor, materials and equipment to flush, tag and fill chilled water system		Flushing, Filling and tag 1LOT@1,029=\$1,029; Glycol system install and fill 1LOT@\$2,058=\$2,058		
2.3.8.16	Startup & Bal CHW	Provide for labor, materials and equipment to startup chilled water system, including the testing adjustng and balancing		50% Chiller Commissioning Test support 50% of 32HR@\$67=\$1,070; Testing Adjusting Balancing 4Day@\$679=\$2716		
2.3.8.17	Comm and Training	Provide for labor, materials and equipment to do a chiller commissioning		50% Chiller Commissioning Test support 50% of 32HR@\$67=\$1,070; Controls 30% of 1LOT@\$59,039=\$17,712		
2.3.9	High Density Computer Cooling	Provides for the material, labor and equipment to supply and install the computer Room Air Conditioners (CRAC) on the 3rd floor. Liebert units were used for the costs and sizeing of the units. The units will supply cooling and humity contol using the access floor as the supply plentum and the room as the return plentum.		THIRD FLR SYSTEM (\$195.986)		
2.3.9.1	S & A Computer Rm. Air Handlers					
2.3.9.2	F & D Computer Room Air handlers					
2.3.9.3	Install Comp. Rm Condensers pad mnt.	Provide for labor, materials and equipment to do install the condensing unit outside the building		Cooling & Condensing Unit 50% of 4EA@\$30,870=\$61,740; Installation 50% of 4@\$3,087=\$6,174		
2.3.9.4	Install Comp room Air handlers EI; 766	Provide for labor, materials and equipment to do install the computer room air conditioning unit inside the building		Cooling & Condensing Unit 50% of 4EA@\$30,870=\$61,740; Installation 50% of 4@\$3,087=\$6,175; Sitescan & service 1LOT@\$6,560=\$6,560; Crane for unit installation 1LOT@\$5,145=\$5,145		
2.3.9.5	Ref. Piping CRAC	Provide for labor, materials and equipment to do install the refrigerant piping from the condensing unit outside to the cooling unit inside		Refrigerant Piping installation 4LOT@\$2,058=\$8,232; Piping support 1LOT@\$2,058=\$2,058; Misc fittings and gauges 1LOT@\$2,058=\$2,058		
2.3.9.6	Leak Test and Charge Ref Piping	Provide for labor, materials and equipment to do leak testing, and charging of the refrigerant		Leak testing 16HR@\$67=\$1,070; Flushing, cleaning, pipe tag 1LOT@\$2,058=\$2,058		
2.3.9.7	Install DCW & Humidifier	Provide for labor, materials and equipment to run domestic water to the cooling unit humidifier section		Domestic water copper pipe to humidifier 500LF@\$19=\$9,261		
2.3.9.8	Insulate and Tag Piping	Provide for labor, materials and equipment to insulate and tag the refrigerant piping		Insulation refrigerant piping 4LOT@\$3,023=\$12,092		

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

Activity ID	Activity Description	WBS_Dictionary [Note Category]	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.9.9	Install Controls	Provide for labor, materials and equipment to install the sensors and controls		Controls 1LOT@\$10,805=\$10,805		*
2.3.9.10	Startup Balance Comm and Training	Provide for labor, materials and equipment to do startup and commissioning of the cooling unit		Balancing 1 day @ \$679=\$679, Commissioning Support 32 hr@\$67=\$2,140		
2.3.10	Motor Control Center (MCC)	Provides the material, equipment and labor to intall the starters for the large mechanical equipment such as the chiller, pumps and large HVAC units.				
2.3.10.1	S & A MCC					
2.3.10.2	F & D Motor Control Center					
2.3.10.3	Install Motor Control Center			600 Amp Motor Control Center 1ea. @ \$17,096=\$17,096 300 Amp Motor Control Center 1ea. @ \$10,290= \$10,290		
2.3.11	Power Distribution and Lighting	Provides the materials, equipment, and labor to supply and install the utility house power (120/208v outlets and lighing in the mechanical room and the mezzanine floors. This is incidental power outlet (not rack power) The high bay and collision hall lightingis already installed.				
2.3.11.1	S & A Material Submittals					
2.3.11.2	Fab and Del.					
2.3.11.3	SC: Delayed Start of elec.					

BTev - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information							
Activity ID	Activity Description	WBS_Dictionary Category]	[Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.11.4	Rough In Power & Lighting El 731				50 % of (\$75,536) Panel EPHP-CO-3- 1ea.@ \$5,742=\$5,742 45 KVA Transformer ETR-EPP 1ea. \$3,581=\$3,581 Panel EPP-CO-3- 150 Amp MCB 1ea. @ \$2,324=\$2,324 #1/0 3clf @ \$110=\$329 #6 Ground 1.5clf @ \$93=\$139 2 Inch RGS Conduit 50lf @ \$20=\$984 Panel PP-CO-3- 100 AMP MLO 1ea.@ \$1,669 =\$1,669 100 Amp Fusible Disconnect Switch 1ea. @ \$642=\$642 #2 AWG 3.5clf @ \$158=\$551 #8 AWG Ground 1.5clf @ \$61=\$92 1 1/4 Inch Conduit 75lf @ \$12= \$863 Reconnect Existing Transformer for Panel PP-CO-3-5 1ea. @ \$1,972=\$1,972 #1 AWG 3.5clf @ \$205=\$719 #8 Ground 1.5clf @ \$74= \$112 1 1/2 Inch RGS Conduit 75lf @ \$14= \$1,032 400 Amp Chiller Disconnect Switch 2ea. @ \$2,148= \$4,297 350 MCM 7clf @ \$534=\$3,738 #3 Ground 2.5clf @ \$161=\$401 3 Inch RGS Conduit 200lf @ \$34= \$6,767 Trench and Backfill 200lf @ \$4=\$789 #10 AWG 13clf @ \$57= \$740 3/4 Inch RGS Conduit 300lf @ \$68 =\$20,437 Level El. 731-0 Power \$17,619 2 Lamp Fluorescent Light Fixtures 17ea. @ \$246=\$4,184 boxes 17ea. @ \$27=\$452 Cover Plates 17ea. @ \$12=\$209 Fixture Whips 17ea. @ \$77=\$1,305 #10 AWG 8.5clf @ \$57=\$484 3/4 Inch Conduit 200lf @ \$8=\$1,576 120 Volt Quad Receptacles 20ea. @ \$48=\$963 Boxes 10 ea. @ \$27=\$266 Cover Plates 10ea. @ \$14= \$144 #10 AWG 12.5clf @ \$57=\$712 3/4 Inch Conduit 175lf @ \$8=\$1,379 60 Amp Weld Receptacle 2ea. @ \$858=\$1,716 #6 AWG 6.5clf @ \$96=\$627 #10 AWG 2clf @ \$57= \$114 1 Inch Conduit 150lf @ \$10=\$1,489 Motor Connections 8ea. @ \$250=\$2,000		
2.3.11.5	Rough In Power & Lighting El 746'-6				50% of (\$18,524) Level El 746 Power \$18,524 2'X4' Recessed Fluorescent Fixture 20ea. @ \$224=\$4,483 2 Lamp Industrial Fluorescent 6ea. @ \$202=\$1,213 Exit Lights 4ea. @ \$424=\$1,696 Emergency Lights 6 ea.@ \$446 =\$2,676 Switches 5ea. @ \$27=\$135 Boxes 41ea. @ \$27=\$1,089 Cover Plates 36ea. @ \$12=\$442 Cover Plates 5ea. @ \$14= \$72 Fixture Whips 36ea. @ \$77=\$2,764 Occupancy Sensors 4ea. @ \$196 = \$782 #12 AWG 16.5clf. @ \$51=\$835 3/4 Inch Conduit 300lf. @ \$8=\$2,337		

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

Activity ID	Activity Description	WBS_Dictionary Category]	[Note	BoE: _Ground_Rules_&_Assumptions [Note	BoE: Materials & Services [Note Category]	BoE: _Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.11.6	Rough In Power & Lighting El. 755'-4				50 % of (\$41,628) Level 755 \$41,628 2' X 4" Recessed Fluorescent Fixtures 24ea. @ \$202=\$4,852 Exit Lights 4ea. @ \$380=\$1,520 Emergency Lights 10ea. @ \$380=\$3,800 Boxes & Cover Plates 38ea. @ \$39= \$1,476 Fixture Whips 38ea. @ \$77=\$2,917 Switches 8ea.@ \$27=\$216 Occupancy Sensors 8ea. @ \$196= \$1,565 #10 AWG 18clf @ \$59= \$1,060 3/4 Inch Conduit 500lf @ \$8= \$3,895 Panel PP 150 Amp MCB 1ea. @ \$1,784=\$1,784 200 Amp Disconnect Switch Fused 1ea. @ \$856= \$856 #1/0 6clf @ \$228=\$1,369 #6 Ground 2.5clf @ \$96 =\$241 2 Inch Conduit 125lf @ \$17=\$2,064 Wiremold 100lf @ \$47=\$4,719 Receptacles 20 Amp 15ea. @ \$26=\$385 #10 AWG 15clf @ \$59= \$883 3/4 Inch Conduit 150lf @ \$8= \$1,168 Duplex Receptacles 20 Amp 40ea. @ \$26=\$1,026 Boxes 25 ea. @ \$27=\$664 Cover Plates 25ea. @ \$12=\$307 #10 AWG 23clf @ \$59 = \$1,355 3/4 Inch Conduit 450lf @ \$8= \$3,505		
2.3.11.7	Rough In Power & Lighting El 766'-0				50 % of (\$45,370) Level 766 \$28,426 Lighting Light Fixtures 2 X 4 Fluoresc. Troffers 31ea.@ \$202=\$6,267 Stair Light Fixtures 12ea. @ \$191=\$2,296 Emergency Lights 16ea. @ \$380= \$6,081 Exit Lights 4ea. @ \$380= \$1,520 Switches 6ea. @ \$27=\$162 Boxes 65 ea. @ \$39=\$2,512 Fixture Whips 65ea. @ \$77=\$4,990 Occupancy Sensors 4ea. @ \$196=\$782 #10 AWG 18.5clf @ \$59=\$1,090 3/4 Inch Conduit 350lf. @ \$8= \$2,726 Branch Circuits for Computer Room Units \$16,944 #2 AWG 12clf @ \$157= \$1,885 #8 Ground 4clf @ \$67=\$268 1 1/4 Inch Conduit 350lf. @ \$12= \$4,035 Emergency Power Off Button 8ea. @ \$116= \$932 Add Shunt Trip to Circuit Breakers 8ea. @ \$265 =\$2,120 #10 AWG 22clf @ \$68=\$1,506 3/4 Inch Conduit 685lf. @ \$9=\$6,200		

BTev - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.11.8	Trim Out House Power El 731'-0			50 % of (\$75,536) Panel EPHP-CO-3- 1ea.@ \$5,742=\$5,742 45 KVA Transformer ETR-EPP 1ea. \$3,581=\$3,581 Panel EPP-CO-3- 150 Amp MCB 1ea. @ \$2,324=\$2,324 #1/0 3clf @ \$110=\$329 #6 Ground 1.5clf @ \$93=\$139 2 Inch RGS Conduit 50lf @ \$20=\$984 Panel PP-CO-3- 100 AMP MLO 1ea.@ \$1,669 =\$1,669 100 Amp Fusible Disconnect Switch 1ea. @ \$642=\$642 #2 AWG 3.5clf @ \$158=\$551 #8 AWG Ground 1.5clf @ \$61=\$92 1 1/4 Inch Conduit 75lf @ \$12= \$863 Reconnect Existing Transformer for Panel PP-CO-3-5 1ea. @ \$1,972=\$1,972 #1 AWG 3.5clf @ \$205=\$719 #8 Ground 1.5clf @ \$74= \$112 1 1/2 Inch RGS Conduit 75lf @ \$14= \$1,032 400 Amp Chiller Disconnect Switch 2ea. @ \$2,148= \$4,297 350 MCM 7clf @ \$534=\$3,738 #3 Ground 2.5clf @ \$161=\$401 3 Inch RGS Conduit 200lf @ \$34= \$6,767 Trench and Backfill 200lf @ \$4=\$789 #10 AWG 13clf @ \$57= \$740 3/4 Inch RGS Conduit 300lf @ \$68 =\$20,437 Level El. 731-0 Power \$17,619 2 Lamp Fluorescent Light Fixtures 17ea. @ \$246=\$4,184 boxes 17ea. @ \$27=\$452 Cover Plates 17ea. @ \$12=\$209 Fixture Whips 17ea. @ \$77=\$1,305 #10 AWG 8.5clf @ \$57=\$484 3/4 Inch Conduit 200lf @ \$8=\$1,576 120 Volt Quad Receptacles 20ea. @ \$48=\$963 Boxes 10 ea. @ \$27=\$266 Cover Plates 10ea. @ \$14= \$144 #10 AWG 12.5clf @ \$57=\$712 3/4 Inch Conduit 175lf @ \$8=\$1,379 60 Amp Weld Receptacle 2ea. @ \$858=\$1,716 #6 AWG 6.5clf @ \$96=\$627 #10 AWG 2clf @ \$57= \$114 1 Inch Conduit 150lf @ \$10=\$1,489 Motor Connections 8ea. @ \$250=\$2,000		
2.3.11.9	Trim Out Power & Lighting El 746'-6			50% of (\$18,524) 2'X4' Recessed Fluorescent Fixture 20ea @ \$224=\$4,483 2 Lamp Industrial Fluorescent 6ea. @ \$202=\$1,213 Exit Lights 4ea. @ \$424=\$1,696 Emergency Lights 6 ea.@ \$446 =\$2,676 Switches 5ea. @ \$27=\$135 Boxes 41ea. @ \$27=\$1,089 Cover Plates 36ea. @ \$12=\$442 Cover Plates 5ea. @ \$14= \$72 Fixture Whips 36ea. @ \$77=\$2,764 Occupancy Sensors 4ea. @ \$196 = \$782 #12 AWG 16.5clf. @ \$51=\$835 3/4 Inch Conduit 300lf. @ \$8=\$2,337		

BTev - WBS 3.0 C0 Building Outfitting
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information

Activity ID	Activity Description	WBS_Dictionary Category]	[Note	BoE: _Ground_Rules_&_Assumptions [Note	BoE: Materials & Services [Note Category]	BoE: _Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.11.10	Trim Out Power & Lighting El. 755'-4				50 % of (\$41,628) 2' X 4" Recessed Fluorescent Fixtures 24ea. @ \$202=\$4,852 Exit Lights 4ea. @ \$380=\$1,520 Emergency Lights 10ea. @ \$380=\$3,800 Boxes & Cover Plates 38ea. @ \$39= \$1,476 Fixture Whips 38ea. @ \$77=\$2,917 Switches 8ea.@ \$27=\$216 Occupancy Sensors 8ea. @ \$196= \$1,565 #10 AWG 18clf @ \$59= \$1,060 3/4 Inch Conduit 500lf @ \$8= \$3,895 Panel PP 150 Amp MCB 1ea. @ \$1,784=\$1,784 200 Amp Disconnect Switch Fused 1ea. @ \$856= \$856 #1/0 6clf @ \$228=\$1,369 #6 Ground 2.5clf @ \$96 =\$241 2 Inch Conduit 125lf @ \$17=\$2,064 Wiremold 100lf @ \$47=\$4,719 Receptacles 20 Amp 15ea. @ \$26=\$385 #10 AWG 15clf @ \$59= \$883 3/4 Inch Conduit 150lf @ \$8= \$1,168 Duplex Receptacles 20 Amp 40ea. @ \$26=\$1,026 Boxes 25 ea. @ \$27=\$664 Cover Plates 25ea. @ \$12=\$307 #10 AWG 23clf @ \$59 = \$1,355 3/4 Inch Conduit 450lf @ \$8= \$3,505		
2.3.11.11	Trim Out Power & Lighting El 766'-0				50 % of (\$45,370) Level 766 \$28,426 Lighting Light Fixtures 2 X 4 Fluoresc. Troffers 31ea.@ \$202=\$6,267 Stair Light Fixtures 12ea. @ \$191=\$2,296 Emergency Lights 16ea. @ \$380= \$6,081 Exit Lights 4ea. @ \$380= \$1,520 Switches 6ea. @ \$27=\$162 Boxes 65 ea. @ \$39=\$2,512 Fixture Whips 65ea. @ \$77=\$4,990 Occupancy Sensors 4ea. @ \$196=\$782 #10 AWG 18.5clf @ \$59=\$1,090 3/4 Inch Conduit 350lf. @ \$8= \$2,726 Branch Circuits for Computer Room Units \$16,944 #2 AWG 12clf @ \$157= \$1,885 #8 Ground 4clf @ \$67=\$268 1 1/4 Inch Conduit 350lf. @ \$12= \$4,035 Emergency Power Off Button 8ea. @ \$116= \$932 Add Shunt Trip to Circuit Breakers 8ea. @ \$265 =\$2,120 #10 AWG 22clf @ \$68=\$1,506 3/4 Inch Conduit 685lf. @ \$9=\$6,200		

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
2.3.12	Side Bay Computer Power			Experiment Electronics \$153395 2000 Amp Switchboard Exist 1ea. @ \$10,000=\$10,000 500 MCM Bare CU. Ground 2clf @ \$450=\$899 Ground Bar 1ea. @ \$446=\$446 75 KVA Transformer K4 Rated 7ea. @ \$8,619=\$60333 #1 AWG 8clf @ \$205=\$1,639 #6 AWG Ground 3clf @ \$96=\$289 1 1/2 Inch Conduit 210lf@ \$13= \$2,776 225 Amp Circuit Breaker 7ea. @ \$1,776=\$14,212 #4/0 AWG 29clf @ \$374=\$10,849 #4 AWG Ground 9clf @ \$124=\$1,114 2 1/2 Inch Conduit 700 lf @ \$24= \$16,800 Ground Bar (Transformers) 8ea. @ \$446=\$3,568 #6 AWG Ground 2.5 clf @ \$95=\$239 225 Amp Panelboard 7 ea. @ \$4,573=\$32011		
2.3.12.1	Install User Panels El 746'-6			40 % of 2.3.12 (\$153,395)		
2.3.12.2	ECP-02 Elec Trigger Mods			75KVA Transformer @ \$8619 #1 AWG 1CLF \$205.00 225 AMP Circuit Breaker \$1776.00 Conduit \$1812.00 #4 AWG \$374.00 225 Amp Panelboard \$4573.00 Groundbar \$446		
2.3.12.3	Install User Panels El. 766'-0			60 % of 2.3.12 (\$153,395)		
2.3.12.4	Phase 2 Ready By					
2.3.13	Underfloor Fire Protection	Provides for the materials, equipment, and labor to supply and install Sprinkler Piping under the access floors in the upper and lower mezzinine floors.				
2.3.13.1	Underfloor FP at El 746'-6"			El 766 Underfloor Sprinklers 1980 * \$8 = \$15,845		
2.3.13.2	Underfloor FP @ El 766'			El 766 Underfloor Sprinklers 1980 sf @ \$8 = \$15,845		
2.3.14	Coll. Hall	Provides for the materials, equipment and labor to supply and install the HVAC and fancoil cooling equipment inside the Collision Hall.		COLL HALL HVAC WORK (\$44,828)		
2.3.14.1	Collision Hall work, (Duct, fancoil, Piping	Provide for labor, materials and equipment to install fancoils, and related accessories, ductowrk etc		FanCoils 8EA@\$3,087=\$24,696; 50% of scaffolding 50% of 1LOT@\$4,116=2.058		
2.3.14.2	Balance HVAC Sys. Col Hall	Provide for labor, materials and equipment to test, adjust and balance the fancoil system		Balancing of system 30% of 10Day@\$679=\$2,037		
2.3.14.3	Start Up and Comm (Shutdown Related)	Provide for labor, materials and equipment to do startup of fancoil		15% of controls 15% of 1LOT@\$69,458=\$10,418; 50% of commissinoing 50% of 1LOT@\$11,237=\$5,618		
2.3.14.4	Commision Coll. Hall					
3	C Sector High Voltage Power Upgrade	The C Sector High Voltage Power Upgrade installs a new 13.8 feeder from the Kautz Road Substation (KRS) tp Main Ring Service Building B-4. This feeder will provide power to C-0 for user quiet power, power supplies and conventional power. This project also provides power taps off of the existing TeVatron feeder 23 to B-4, C-0 and C-1 main Ring Service Buildings for the WBS 2.0 power supplies.				
3.1	Design to Award C Sector High Voltage					
3.1.1	SC: Delayed Start of Eng.					

BTeV - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
3.1.2	Title II EDIA FESS Engineering				EDIA was calculated using 21% of the C Sector High Voltage Construction estimate and the estimate for procured items. EDIA was distributed between the C sector High Voltage project and procured items justifying towards the C Sector project. This is resonable since much of the design and installation cost for the procured items will be accomplished as part of the C Sector project. Of the 21% for EDIA 10 % used for Title 2 and 11% used for Title 3	
3.1.3	Title II EDIA Consultant Eng.					
3.1.4	Construction Req.					
3.1.5	Release for Bid					
3.1.6	Pre- Bid Meeting					
3.1.7	Establish Source Criteria					
3.1.8	Receive Proposals					
3.1.9	Source Selection and Award					
3.2	Title 3 EDIA C Sector High Voltage					
3.2.1	Engineering Effort					
3.2.2	Work Force Safety Promotions					
3.3	C Sector High Voltage Const. Contract		C Sector High Voltage will be a fixed price contract based on competitive proposals. The award of the contract will be based on price, safety qualifications, understanding of schedule requirements and qualifications and experience of key personnel.			
3.3.1	SC: Delayed Const Start					
3.3.2	Notice to Proceed					
3.3.3	Mobilize					
3.3.4	KRS to B-4	Installs the pre-procured 13.8KV feeders (See sub-project 4) through the existing Main Ring Duct bank.		KRS to C-0 Feeder\$212,309 Cable procured seperatly 15 KV Air Circuit Breaker 1ea. @ \$31,409=\$31,409 Current Transformers 3ea. @ \$2,440=\$7,320 Potential Transformers 3ea. @ \$3,469=\$10,406 5 Inch RGS Elbows 24ea. @ \$345=\$8,278 install 15 KV 750 MCM 150clf @ \$833=\$125000 3/4 Inch X 10 Ft. Ground Rods 20ea. @ \$191= \$3,819 15 KV Inline Splices 10ea. @ \$502=\$5,016 High Pot Test Cables 1lot@ \$6,081=\$6,081 Cable Support in Manholes 14 ea. @ \$892= \$12,488 Fire Wrap Cables in Manholes 14ea. @ \$818= \$11,451		
3.3.4.1	SC: Delayed Pulling Cables					
3.3.4.2	Install Switch in KRS			\$27,480 of 3.2.4		

BTev - WBS 3.0 C0 Building Outfitting						
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
3.3.4.3	Pull Cable KRS to E2			\$27,480 of 3.2.4		
3.3.4.4	Pull Cable E2 to E-0			\$27,480 of 3.2.4		
3.3.4.5	Pull Cable E-0 to C-2			\$27,480 of 3.2.4		
3.3.4.6	Pull Cable C-2 to C-0			\$17,064 of 3.2.44		
3.3.4.7	Pull Cable C-0 to B-4			\$17,064 of 3.2.4		
3.3.4.8	Fire wrap E-2, E-0, D-2			\$17,064 of 3.2.4		
3.3.4.9	Fire wrap C-4, C-2, B-4			\$17,064 of 3.2.4		
3.3.4.10	Terminate in 4 way switch			\$17,064 of 3.2.4		
3.3.4.11	Splice to Feeder 49			\$8,536 of 3.2.4		
3.3.4.12	Test Cables			\$8,536 of 3.2.4		
3.3.5	IR Primary Power	Installs the pre-procured feeders, switchgear and primary transformers at Main Ring Service Buildings B-4, C-0 and C-1 and provides for the materials, equipment and labor to supply and install the related conduits and panel boards in the three buildings				
3.3.5.1	SC: Delayed Start of IR					
3.3.5.2	Install Duct Bank B-4			Bldg. B-4 \$31,693 750 MCM 15 KV Cable 450lf@\$13= \$5,865 5 Inch PVC Conduit 140lf. @\$30=\$4,177 15 KV Splices 6ea@ \$485=\$2,913 Install 4 Position 15 KV Switch 1ea.@ \$2000=\$2,000 800 Amp Panelboard 1ea.@ \$2,940=\$2,940 750 MCM 600 Volt 5.5clf@ \$1,083=\$5,958 5 Inch PVC Conduit 120lf. @ \$30=\$3,581 5 Inch Elbows 9 ea@ \$339=\$3,053 Ground Rods 4 ea. @ \$168=\$671 500 MCM Bare CU Ground 50 lf.@ \$5=\$257 Exothermic Weld 12 ea.@ \$98=\$1,173		
3.3.5.3	Install Duct Bank C-0		Plan to use an existing 2000 Amp switchboard supplied by L. Beverly	Bldg C-O \$47,848 750 MCM 15 KV Cable 450 lf. @ \$13=\$5,699 5 Inch PVC Conduit 140lf. @ \$30=\$4,060 15 KV Splices 6ea.@ \$485=\$2,831 750 MCM 600 Volt Cable 12clf. @\$1,083= \$12,634 5 Inch PVC Conduit 300lf.@ \$30= \$8,699 5 Inch Elbows 10ea.@ \$339=\$3,297 Ground Rods 4ea.@ \$168=\$652 500 MCM Bare CU. Ground 100lf. @ \$5=\$469 Exothermic Weld 12 ea.@ \$98 =\$1,173 Exist. 2000A Installed 1ea.@ \$8,335=\$8,335		
3.3.5.4	Install Duct Bank C-1			Bldg. C-1 \$25,460 750 MCM, 15 KV Cable 250 lf. @\$13 \$3,344 5 Inch PVC Conduit 70lf.@ \$30=\$2,089 15 KV Splices 6ea@ \$485=\$2,913 4 Position Switch 1ea.@ \$2,000=\$12,481 800 Amp Panelboard 1ea.@ \$2,940= \$2,940 750 MCM 600 Volt Cable 4 clf@ \$1,083=\$4,333 5 Inch Conduit 120lf.@ \$30 \$3,581 5 Inch Elbows 9ea @\$339=\$3,053 Ground Rods 4ea@ \$168= \$671 Exothermic Weld 12 ea @ \$98 =\$1,173 500 MCM Bare CU. Ground 50lf.@ \$5=\$257		

BTeV - WBS 3.0 C0 Building Outfitting						
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
3.3.5.5	Install Transformer Pad B-4			750 KVA + Switch Pads 1 EA @ \$8,232=\$8,232		
3.3.5.6	Install Transformer Pad C-0			1500 KVA Trans. Pad w/ containment 1EA@\$22,638=\$22,638		
3.3.5.7	Install Transformer Pad C-1			750 KVA + Switch Pads 1EA@\$8,232= \$8,232		
3.3.5.8	Install Transformer B-4			1 lot at \$5,000		
3.3.5.9	Install Transformer C-0			1 lot at \$10,000		
3.3.5.10	Install Transformer C-1			1 lot @ \$5,000		
3.3.5.11	Install Panel boards			1 Lot @ \$9,500		
3.3.5.12	Pull 13.8 KV Primary, splice and wrap B-4			Included in 3.3.5.2, 3.3.5.3 & 3.3.5.4		
3.3.5.13	Pull 13.8 KV Primary, splice and wrap C-0			Included in 3.3.5.2, 3.3.5.3 & 3.3.5.4		
3.3.5.14	Pull 13.8 KV Primary, splice and wrap C-1			Included in 3.3.5.2, 3.3.5.3 & 3.3.5.4		
3.3.5.15	Pull and terminate secondary			Included in 3.3.5.2, 3.3.5.3 & 3.3.5.4		
3.3.5.16	Clean Transformers			Included in 3.3.5.2, 3.3.5.3 & 3.3.5.4		
3.3.5.17	Testing			Included in 3.3.5.2, 3.3.5.3 & 3.3.5.4		
3.3.5.18	Punch List					
3.3.5.19	C Sector H V Ready By					
4	Pre Procured Items					
4.1	Procure Item EDIA FESS					
4.2	Write procured item specs					
4.3	SC: Delay RFP's					
4.4	Bid and award cable	13.8 Triplex XPR feeder cable				*
4.5	Phase 1 Cable Procure and delivery					*
4.6	C Sector Cable procure and delivery					*
4.7	Bid and award transformers					
4.8	Phase 1 Transformer Procure and Deliver					
4.9	C SectorTrans. procure and delivery					
4.10	Bid and award Air switch	S&C 4 bay air switch				*
4.11	Phase 1 4-Bay Switch Procure and Delivery					*
4.12	C Sector 4-Bay Switch procure and delivery					*
5	CDR, ACDR, & Project Reviews					
5.1	FY04 Fess Engineering					
5.2	FY04 Consultant Engineer					
5.3	FY05 Fess Engineering					
5.4	FY05 Consultant Engineer					
6	Milestones					
6.1	Inter-Subproject link Milestones					
6.1.1	Pre-Conceptual R&D Phase Milestones					
6.1.1.1	Lk3M:Start FY04					
6.1.1.2	Lk3M: End FY 04					
6.1.2	Construction Phase Milestones					
6.1.2.1	Lk3M: Start FY05					
6.1.2.2	Lk3M: Start FY05 Shutdown					

BTeV - WBS 3.0 C0 Building Outfitting						
Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
6.1.2.3	Lk3M: End FY05 Shutdown					
6.1.2.4	Lk3M: End Y05					
6.1.2.5	Lk3M: Start FY06					
6.1.2.6	Lk3M: Start FY06 Shutdown					
6.1.2.7	Lk3M: End FY06 Shutdown					
6.1.2.8	Lk3M: End FY06					
6.1.2.9	Lk3M: Start FY07					
6.1.2.10	Lk3M: Start FY07 Shutdown					
6.1.2.11	Lk3M: End FY07 Shutdown					
6.1.2.12	Lk3M: End FY07					
6.1.2.13	Lk3M: Start FY08					
6.1.2.14	Lk3M: Start FY08 Shutdown					
6.1.2.15	Lk3M: End FY08 Shutdown					
6.1.2.16	Lk3M: End FY08					
6.1.2.17	Lk3M: Start FY09					
6.1.2.18	Lk3M: Start FY09 Shutdown					
6.1.2.19	Lk3M: End FY09 Shutdown					
6.1.2.20	Lk3M: End FY09					
6.1.2.21	Lk3M: Start FY10					
6.1.2.22	Lk3M: Start Final Installation Shutdown					
6.1.2.23	Lk3M: End Final Installation Shutdown					
6.1.2.24	Lk3M: End Construction Phase					
6.1.2.25	Lk3M: End FY10					
6.2	DOE, Fermilab and BTeV Management Milestones					
6.2.1	Tier 0 DOE Headquarters CD Milestones					
6.2.1.1	T0M: CD-0 Approved Mission Need					
6.2.1.2	T0M: CD-1 Approve Preliminary Baseline Range					
6.2.1.3	T0M: CD-2 Approve Performance Baseline					
6.2.1.4	T0M: CD-3a Approve Limited Construction					
6.2.1.5	T0M: CD-3b Approve Start of Construction					
6.2.1.6	T0M: CD-4 Approve Start of Ops - Project Closeout					
6.2.2	Tier 1DOE Headquarters Milestones					
6.2.2.1	T1M-2: Occupancy: C0 low lvl, upper staging area					
6.2.3	Tier 2 DOE Chicago Milestones					
6.2.3.1	T2M-23: Start C0 Outfitting construction					
6.2.3.2	T2M-24: Occupancy: C0 low lvl, upper staging area					
6.2.3.3	T2M-25: C0 Outfitting construction complete					
6.2.4	Tier 3 Fermilab Directorate, BTeV Mgnt. Milestones					
6.2.4.1	T3M-84: Start C0 Outfitting construction					
6.2.4.2	T3M-85: Occupancy: C0 low lvl, upper staging area					
6.2.4.3	T3M-86: Collision Hall completed					

BTev - WBS 3.0 C0 Building Outfitting Data Entry for WBS Dictionary & Basis of Estimate WBS Activity Information						
Activity ID	Activity Description	WBS_Dictionary Category] [Note	BoE:_Ground_Rules_&_Assumptions [Note Category]	BoE: Materials & Services [Note Category]	BoE:_Labor [Note Category]	Cost Book Material Provided (Code Field C30)
6.2.4.4	T3M-87: Assy, Service Bldg construction completed					
7	EarlyTarget Ready By Dates					
7.1	T5M: MS-1 Start Engineering					
7.2	T4M: MS-2 Start Construction	Notice to proceed issued for C-0 Outfitting Phase 1				
7.3	T5M: MS-3 Side Bay. Struct. Complete	Structural Steel erected and detailed: posttensioned concrete deck cast and tensioned. Formwork removed ready for raised decks at El: 755 and 760. Ready for masonry.				
7.4	T5M: MS-4 Temo Power Operational (Fdr 45)	Feeder 45 connected to switcha t b-4, feeder, switchgear and transfore\mer installed at C0 Building. Hi pot testing complete, feeder operational.				
7.5	T4M: MS-5 Beneficial occupancy of lower level and upper staging area	All work in the lower and upper assembly hall complete. The truck dock has shared access with Fermilab. Masonry walls installed and painted. Elevator installed ready for power. Toilet rooms functional.				
7.6	T5M: MS-6 Collision Hall Complete					
7.7	T5M: MS-7 Mechancal Systems Complete (Except CH)					
7.8	T5M: MS-8 Electrical Systems Complete					
7.9	T4M: MS-9 Assembly, Service Building Construction Complete					
7.10	T5M: MS-10 Engineering Complete					

Performance Measurement Baseline Schedule

Immediately follows this page

The total float in the Performance Measurement Baseline Schedule and the Obligation Schedule is consistent between the two schedules. The Performance Measurement Baseline Schedule has the float distributed, using “dummy” activities inserted at critical or near critical activities. This schedule is to be used for determining earned value. The float duration between the “ready by” and “need by” activities for each subproject is the threshold for acceptable schedule variance.

The Obligation Schedule at the end of this section zero's out the “dummy” activities so that the float indicated between the ready by” and “need by” activities represents the total float for the subproject. This schedule determines the required obligation profile.

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
1	C-0 Outfitting Phase 1	\$1,737,180	\$276,404	\$2,013,585	04Jan05	05Jun06	37d	1					
1.1	Design to Award C-0 Phase 1	\$0	\$0	\$0	04Jan05	03May05	44d	1.1					
1.1.1	SC: Delay Proj. Start	\$0	\$0	\$0	04Jan05	01Feb05	44d	1.1.1					
1.1.2	Title II EDIA FESS Phase 1	\$0	\$0	\$0	02Feb05	01Mar05	44d	1.1.2					
1.1.3	Title II EDIA Consultant Phase 1	\$0	\$0	\$0	09Feb05	01Mar05	44d	1.1.3					
1.1.4	Construction Req.	\$0	\$0	\$0	02Mar05	08Mar05	44d	1.1.4					
1.1.5	Release for Bid	\$0	\$0	\$0	09Mar05	15Mar05	44d	1.1.5					
1.1.6	Pre-Bid Meeting	\$0	\$0	\$0	06Apr05	06Apr05	58d	1.1.6					
1.1.7	Establish Source Criteria	\$0	\$0	\$0	13Apr05	15Apr05	54d	1.1.7					
1.1.8	Receive Proposals	\$0	\$0	\$0	16Mar05	12Apr05	44d	1.1.8					
1.1.9	Source Selection & Award	\$0	\$0	\$0	13Apr05	03May05	44d	1.1.9					
1.2	Title 3 EDIA C-0 Outfitting Phase 1	\$9,551	\$276,404	\$285,956	04May05	17May06	49d	1.2					
1.2.1	Engineering Effort	\$6,651	\$276,404	\$283,056	04May05	17May06	49d	1.2.1					
1.2.2	Work Force Safety Promotions	\$2,900	\$0	\$2,900	04May05	17May06	49d	1.2.2					
1.3	C-0 Outfitting Phase 1 Construction Contract	\$1,727,628	\$0	\$1,727,628	01Apr05	05Jun06	37d	1.3					
1.3.1	SC: Delayed Const. Start	\$0	\$0	\$0	01Apr05	12May05	37d	1.3.1					
1.3.2	Notice to Proceed	\$0	\$0	\$0	13May05	13May05	37d	1.3.2					
1.3.3	Mobilize	\$18,580	\$0	\$18,580	16May05	27May05	37d	1.3.3					
1.3.4	Site Concrete	\$30,423	\$0	\$30,423	31May05	02Aug05	53d	1.3.4					
1.3.4.1	S & A Concrete Mix	\$0	\$0	\$0	31May05	28Jun05	53d	1.3.4.1					
1.3.4.2	S & A Rebar	\$0	\$0	\$0	31May05	28Jun05	53d	1.3.4.2					
1.3.4.3	FBP Foundations at Stair	\$7,047	\$0	\$7,047	29Jun05	08Jul05	53d	1.3.4.3					
1.3.4.4	Construct Hardstands	\$14,227	\$0	\$14,227	11Jul05	22Jul05	53d	1.3.4.4					
1.3.4.5	Site Utilities	\$5,568	\$0	\$5,568	25Jul05	02Aug05	53d	1.3.4.5					
1.3.4.6	Rework Temp Power	\$0	\$0	\$0	31May05	20Jun05	80d	1.3.4.6					
1.3.4.7	Demo Int. Stair Enclosure	\$3,580	\$0	\$3,580	21Jun05	23Jun05	80d	1.3.4.7					
1.3.5	Structural Steel & Weather Enclosures	\$236,396	\$0	\$236,396	31May05	15Nov05	48d	1.3.5					
1.3.5.1	S & A Steel Shop Drawings	\$0	\$0	\$0	31May05	27Jun05	48d	1.3.5.1					
1.3.5.2	Fab and ship Steel	\$0	\$0	\$0	28Jun05	09Aug05	48d	1.3.5.2					
1.3.5.3	Mezzinine Structural Steel	\$65,774	\$0	\$65,774	10Aug05	23Aug05	48d	1.3.5.3					
1.3.5.4	Structural Steel at Stair #3	\$20,052	\$0	\$20,052	10Aug05	19Aug05	88d	1.3.5.4					
1.3.5.5	Install Steel Stairs and misc.	\$42,019	\$0	\$42,019	18Oct05	21Oct05	48d	1.3.5.5					
1.3.5.6	Siding & Roofing	\$108,549	\$0	\$108,549	24Oct05	15Nov05	48d	1.3.5.6					
1.3.6	Structural Concrete	\$132,940	\$0	\$132,940	31May05	17Oct05	48d	1.3.6					
1.3.6.1	S & A Rebar and Tendons.	\$0	\$0	\$0	31May05	17Jun05	80d	1.3.6.1					
1.3.6.2	Fab Rebar and Tendons	\$0	\$0	\$0	20Jun05	08Jul05	80d	1.3.6.2					
1.3.6.3	FBP Concrete @ El. 755'	\$66,470	\$0	\$66,470	24Aug05	20Sep05	48d	1.3.6.3					
1.3.6.4	FBP Concrete @ El 764'	\$66,470	\$0	\$66,470	21Sep05	17Oct05	48d	1.3.6.4					

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05				FY06				FY07				FY08				FY09				
1.3.7	Concrete Masonry	\$160,167	\$0	\$160,167	31May05	12Jan06	48d																					
1.3.7.1	S & A Masonry SD	\$0	\$0	\$0	31May05	28Jun05	96d																					
1.3.7.2	S & A Doors and Glass	\$0	\$0	\$0	29Jun05	28Jul05	96d																					
1.3.7.3	Concrete Masonry EI 715-0	\$11,113	\$0	\$11,113	29Jul05	10Aug05	96d																					
1.3.7.4	Concrete Masonry EI 731'-4	\$16,670	\$0	\$16,670	18Oct05	07Nov05	54d																					
1.3.7.5	Concrete Masonry EI 746-6	\$36,893	\$0	\$36,893	16Nov05	09Dec05	48d																					
1.3.7.6	Concrete Masonry EI 755-4	\$27,784	\$0	\$27,784	12Dec05	22Dec05	48d																					
1.3.7.7	Concrete Masonry EI 766-0	\$27,784	\$0	\$27,784	23Dec05	04Jan06	48d																					
1.3.7.8	Install Doors and Glass	\$39,920	\$0	\$39,920	05Jan06	12Jan06	99d																					
1.3.8	Conveying System	\$152,488	\$0	\$152,488	31May05	20Jan06	83d																					
1.3.8.1	S & A Elevator SD	\$0	\$0	\$0	31May05	09Aug05	136d																					
1.3.8.2	Fab and Del elev Rails	\$0	\$0	\$0	10Aug05	14Sep05	136d																					
1.3.8.3	Install elev rails	\$28,400	\$0	\$28,400	15Sep05	28Sep05	136d																					
1.3.8.4	Install Elevator Machine Rm	\$56,801	\$0	\$56,801	29Sep05	19Oct05	136d																					
1.3.8.5	Demo Roof	\$1,185	\$0	\$1,185	18Oct05	19Oct05	126d																					
1.3.8.6	Frame, Side & Roof Elevator Head house	\$9,301	\$0	\$9,301	20Oct05	02Nov05	126d																					
1.3.8.7	Install Elevator Cab	\$56,801	\$0	\$56,801	05Jan06	18Jan06	83d																					
1.3.8.8	Energize and Test Elevator	\$0	\$0	\$0	19Jan06	20Jan06	83d																					
1.3.9	Finishes	\$80,428	\$0	\$80,428	22Nov05	15Feb06	83d																					
1.3.9.1	Paint Block Walls	\$18,769	\$0	\$18,769	23Jan06	03Feb06	83d																					
1.3.9.2	Painting including Doors & Glass Frames	\$10,959	\$0	\$10,959	06Feb06	09Feb06	83d																					
1.3.9.3	Rough In Toilet Rm Plumbing	\$23,498	\$0	\$23,498	22Nov05	21Dec05	97d																					
1.3.9.4	Toilet RM Walls	\$0	\$0	\$0	22Dec05	30Dec05	97d																					
1.3.9.5	Toilet Rm Finishes	\$0	\$0	\$0	02Jan06	20Jan06	97d																					
1.3.9.6	Trim out Toilet Rm. Fixtures	\$23,498	\$0	\$23,498	10Feb06	15Feb06	83d																					
1.3.9.7	Install Toilet Room Exhaust	\$3,704	\$0	\$3,704	22Dec05	23Dec05	102d																					
1.3.10	Fire Protection	\$96,654	\$0	\$96,654	05Jan06	24Mar06	48d																					
1.3.10.1	SC: Delay Start of FP	\$0	\$0	\$0	05Jan06	25Jan06	48d																					
1.3.10.2	Install Fire Riser to High Bay	\$8,406	\$0	\$8,406	26Jan06	31Jan06	48d																					
1.3.10.3	Install Fire Riser to Side bay	\$8,406	\$0	\$8,406	01Feb06	06Feb06	48d																					
1.3.10.4	Rough In Sprinklers EI 731'-4"	\$8,406	\$0	\$8,406	07Feb06	13Feb06	48d																					
1.3.10.5	Rough In sprinklers EI 746'-6	\$12,604	\$0	\$12,604	14Feb06	27Feb06	55d																					
1.3.10.6	Rough In Sprinklers EI.755'-4	\$12,604	\$0	\$12,604	28Feb06	06Mar06	60d																					
1.3.10.7	Rough In Sprinklers EI 766'-0	\$12,604	\$0	\$12,604	07Mar06	20Mar06	60d																					
1.3.10.8	Trim Out Sprinklers EI 731'-4"	\$8,406	\$0	\$8,406	14Feb06	17Feb06	48d																					
1.3.10.9	Trim Out sprinklers EI 746'-6	\$8,406	\$0	\$8,406	28Feb06	03Mar06	55d																					
1.3.10.10	Trim Out Sprinklers EI.755'-4	\$8,406	\$0	\$8,406	07Mar06	10Mar06	60d																					
1.3.10.11	Trim Out Sprinklers EI 766'-0	\$8,406	\$0	\$8,406	21Mar06	24Mar06	60d																					

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
1.3.11	Fire Detection	\$88,905	\$0	\$88,905	20Feb06	04May06	48d		1.3.11				
1.3.11.1	Fire Detection EI 731'-4"	\$9,878	\$0	\$9,878	20Feb06	14Mar06	48d		1.3.11.1				
1.3.11.2	Fire Detection EI 746'-6	\$19,757	\$0	\$19,757	15Mar06	28Mar06	48d		1.3.11.2				
1.3.11.3	Fire Detection EI.755'-4	\$19,757	\$0	\$19,757	29Mar06	11Apr06	48d		1.3.11.3				
1.3.11.4	Fire Detection EI 766'-0	\$19,757	\$0	\$19,757	12Apr06	25Apr06	48d		1.3.11.4				
1.3.11.5	Upgrade Fire Control Panel	\$9,878	\$0	\$9,878	26Apr06	01May06	48d		1.3.11.5				
1.3.11.6	TestI Fire Detection	\$9,878	\$0	\$9,878	02May06	04May06	48d		1.3.11.6				
1.3.12	Power Distribution and Lighting	\$171,276	\$0	\$171,276	31May05	03Apr06	37d	1.3.12					
1.3.12.1	S & A Electrical Devices	\$0	\$0	\$0	31May05	23Aug05	37d	1.3.12.1					
1.3.12.2	Rough In House Power EI 715'-0	\$80,659	\$0	\$80,659	24Aug05	28Sep05	141d	1.3.12.2					
1.3.12.3	Trim Out House Power EI 715'-0	\$80,659	\$0	\$80,659	29Sep05	26Oct05	141d	1.3.12.3					
1.3.12.4	Install Exist. 2000 Amp Switchbd	\$9,958	\$0	\$9,958	13Feb06	02Mar06	81d		1.3.12.4				
1.3.12.5	Pull and terminate secondary	\$0	\$0	\$0	03Mar06	03Apr06	81d		1.3.12.5				
1.3.13	Feeder From B-4 to C-0	\$437,067	\$0	\$437,067	24Aug05	05Jun06	37d	1.3.13					
1.3.13.1	Concrete and Rebar SD	\$0	\$0	\$0	24Aug05	22Sep05	37d	1.3.13.1					
1.3.13.2	Install Duct bank B-4 to Berm	\$42,838	\$0	\$42,838	31Jan06	08Feb06	37d		1.3.13.2				
1.3.13.3	Jack Carrier pipe thru berm	\$21,420	\$0	\$21,420	09Feb06	17Feb06	37d		1.3.13.3				
1.3.13.4	Manhole	\$20,880	\$0	\$20,880	20Feb06	24Feb06	37d		1.3.13.4				
1.3.13.5	Install duct bank berm to C-0 Pad	\$42,838	\$0	\$42,838	27Feb06	15Mar06	37d		1.3.13.5				
1.3.13.6	Install secondary duct bank	\$149,908	\$0	\$149,908	16Mar06	28Mar06	37d		1.3.13.6				
1.3.13.7	Install Pad, C-0 Test Area	\$53,652	\$0	\$53,652	29Mar06	06Apr06	37d		1.3.13.7				
1.3.13.8	Install switch Pad at B-4	\$0	\$0	\$0	07Apr06	14Apr06	37d		1.3.13.8				
1.3.13.9	Set switch at B-4	\$2,400	\$0	\$2,400	16May06	16May06	37d		1.3.13.9				
1.3.13.10	Set Transformers C-0	\$25,200	\$0	\$25,200	28Apr06	02May06	50d		1.3.13.10				
1.3.13.11	Set Switch C-0 Test	\$2,400	\$0	\$2,400	08May06	08May06	43d		1.3.13.11				
1.3.13.12	Set Generator C-0 Test	\$75,531	\$0	\$75,531	08May06	08May06	43d		1.3.13.12				
1.3.13.13	Pull Feeder B-4 to C-0 Test Area	\$0	\$0	\$0	17May06	19May06	37d		1.3.13.13				
1.3.13.14	Terminate Primary	\$0	\$0	\$0	22May06	22May06	37d		1.3.13.14				
1.3.13.15	Punch List (Excluding Elec.)	\$0	\$0	\$0	05May06	18May06	48d		1.3.13.15				
1.3.13.16	Phase 1 Ben. Occ. Ready By	\$0	\$0	\$0	19May06	19May06	48d		1.3.13.16				
1.3.13.17	Phase 1 Complete	\$0	\$0	\$0	23May06	05Jun06	37d		1.3.13.17				
1.3.14	Phase 1 Coll. Hall	\$122,302	\$0	\$122,302	08Aug05	28Sep05	234d	1.3.14					
1.3.14.1	Coll Hall Power	\$91,439	\$0	\$91,439	08Sep05	28Sep05	257d	1.3.14.1					
1.3.14.2	Fire Detection Collision Hall	\$9,878	\$0	\$9,878	08Sep05	21Sep05	262d	1.3.14.2					
1.3.14.3	Rerack Main Ring Manholes	\$20,985	\$0	\$20,985	08Aug05	26Aug05	234d	1.3.14.3					
2	C-0 Outfitting Phase 2	\$1,938,368	\$444,071	\$2,382,439	03Apr06	12Feb08	22d		2				
2.1	Design to Award C-0 Phase 2	\$46,400	\$187,185	\$233,585	03Apr06	24Jan07	22d		2.1				

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

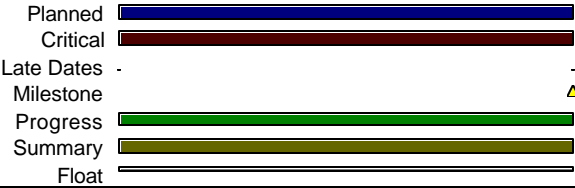
Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05				FY06				FY07				FY08				FY09				
2.1.1	SC: Delayed Start of Eng.	\$0	\$0	\$0	03Apr06	26Jun06	22d									2.1.1												
2.1.2	Title II EDIA FESS	\$0	\$187,185	\$187,185	27Jun06	06Sep06	22d									2.1.2												
2.1.3	Title II EDIA Consultant	\$46,400	\$0	\$46,400	14Sep06	08Nov06	22d									2.1.3												
2.1.4	Construction Req.	\$0	\$0	\$0	09Nov06	15Nov06	22d										2.1.4											
2.1.5	Release for Bid	\$0	\$0	\$0	16Nov06	22Nov06	22d										2.1.5											
2.1.6	Pre- Bid Meeting	\$0	\$0	\$0	16Nov06	16Nov06	26d										2.1.6											
2.1.7	Establish Source Criteria	\$0	\$0	\$0	27Nov06	29Nov06	22d										2.1.7											
2.1.8	Receive Proposals	\$0	\$0	\$0	27Nov06	02Jan07	22d										2.1.8											
2.1.9	Source Selection& Award	\$0	\$0	\$0	03Jan07	24Jan07	22d										2.1.9											
2.2	Title 3 EDIA C-0 Outfitting Phase 2	\$2,900	\$256,885	\$259,785	25Jan07	24Aug07	171d										2.2											
2.2.1	Engineering Effort	\$0	\$256,885	\$256,885	25Jan07	24Aug07	171d										2.2.1											
2.2.2	Work Force Safety Promotions	\$2,900	\$0	\$2,900	25Jan07	24Aug07	171d										2.2.2											
2.3	C-0 Outfitting Phase 2 Construction Contract	\$1,889,068	\$0	\$1,889,068	25Jan07	12Feb08	22d										2.3											
2.3.1	SC: Delayed Start of Construction	\$0	\$0	\$0	25Jan07	18Apr07	22d										2.3.1											
2.3.2	Notice to Proceed	\$0	\$0	\$0	19Apr07	19Apr07	22d											2.3.2										
2.3.3	Mobilize	\$0	\$0	\$0	19Apr07	19Apr07	22d											2.3.3										
2.3.4	Site Concrete	\$114,016	\$0	\$114,016	19Apr07	02Jul07	134d											2.3.4										
2.3.4.1	FBP Chiller Pads	\$34,376	\$0	\$34,376	19Apr07	25Apr07	134d											2.3.4.1										
2.3.4.2	FBP Condenser Pads	\$51,565	\$0	\$51,565	26Apr07	04May07	134d											2.3.4.2										
2.3.4.3	Construct Gas House	\$28,074	\$0	\$28,074	15Jun07	02Jul07	198d											2.3.4.3										
2.3.5	Masonry	\$50,689	\$0	\$50,689	19Apr07	12Jun07	129d											2.3.5										
2.3.5.1	S & A Finishes	\$0	\$0	\$0	19Apr07	17May07	129d											2.3.5.1										
2.3.5.2	C-0 Service Bldg. Mods	\$11,728	\$0	\$11,728	18May07	29May07	212d											2.3.5.2										
2.3.5.3	C-0 SB Buss Duct Enclosure	\$38,960	\$0	\$38,960	30May07	12Jun07	212d											2.3.5.3										
2.3.6	Finishes	\$221,492	\$0	\$221,492	18May07	25Sep07	129d											2.3.6										
2.3.6.1	Fab and Deliver Finishes	\$0	\$0	\$0	18May07	16Jul07	129d											2.3.6.1										
2.3.6.2	Flooring & Carpeting EI 755'-4	\$16,536	\$0	\$16,536	17Jul07	20Jul07	130d											2.3.6.2										
2.3.6.3	Install Computer Floor EI 746'-6	\$72,842	\$0	\$72,842	24Jul07	06Aug07	129d											2.3.6.3										
2.3.6.4	Install Computer Floor EI. 766'-0	\$72,842	\$0	\$72,842	07Aug07	20Aug07	139d											2.3.6.4										
2.3.6.5	C-0 Service Bldg. Mods	\$59,271	\$0	\$59,271	21Aug07	25Sep07	139d											2.3.6.5										
2.3.7	HVAC System	\$403,829	\$0	\$403,829	19Apr07	02Jan08	43d											2.3.7										
2.3.7.1	S & A HVAC Units	\$0	\$0	\$0	19Apr07	17May07	43d											2.3.7.1										
2.3.7.2	F & D HVAC Units	\$0	\$0	\$0	18May07	29Jun07	43d											2.3.7.2										
2.3.7.3	SC: Delayed HVAC Start	\$0	\$0	\$0	02Jul07	06Nov07	74d											2.3.7.3										
2.3.7.4	Install HVAC Units Coll. Hall & Assem Hall	\$80,212	\$0	\$80,212	02Jul07	16Jul07	53d											2.3.7.4										
2.3.7.5	Install HVAC Units + Off & MUA	\$34,913	\$0	\$34,913	07Nov07	20Nov07	74d												2.3.7.5									
2.3.7.6	Duct Work	\$77,068	\$0	\$77,068	21Nov07	30Nov07	81d												2.3.7.6									

30Nov04	Planned	Critical	Late Dates	Milestone	Progress	Summary	Float
			-				

_BTeV30_ALLPRO	5 of 11	WBS3_0

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04



Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05				FY06				FY07				FY08				FY09				
2.3.9.3	Install Comp. Rm Condensers pad mnt.	\$81,497	\$0	\$81,497	02Jul07	18Jul07	95d											2.3.9.3										
2.3.9.4	Install Comp room Air handlers EI; 766	\$93,143	\$0	\$93,143	02Jul07	18Jul07	95d											2.3.9.4										
2.3.9.5	Ref. Piping CRAC	\$14,818	\$0	\$14,818	02Jul07	12Jul07	99d											2.3.9.5										
2.3.9.6	Leak Test and Charge Ref Piping	\$3,754	\$0	\$3,754	19Jul07	24Jul07	95d											2.3.9.6										
2.3.9.7	Install DCW & Humidifier	\$11,113	\$0	\$11,113	25Jul07	26Jul07	95d											2.3.9.7										
2.3.9.8	Insulate and Tag Piping	\$14,510	\$0	\$14,510	27Jul07	31Jul07	95d											2.3.9.8										
2.3.9.9	Install Controls	\$12,965	\$0	\$12,965	01Aug07	06Aug07	95d											2.3.9.9										
2.3.9.10	Startup Balance Comm and Training	\$3,383	\$0	\$3,383	07Aug07	08Aug07	95d											2.3.9.10										
2.3.10	Motor Control Center (MCC)	\$32,863	\$0	\$32,863	19Apr07	30Jul07	96d											2.3.10										
2.3.10.1	S & A MCC	\$0	\$0	\$0	19Apr07	17May07	96d											2.3.10.1										
2.3.10.2	F & D Motor Control Center	\$0	\$0	\$0	18May07	29Jun07	96d											2.3.10.2										
2.3.10.3	Install Motor Control Center	\$32,863	\$0	\$32,863	02Jul07	30Jul07	96d											2.3.10.3										
2.3.11	Power Distribution and Lighting	\$217,270	\$0	\$217,270	19Apr07	06Dec07	22d											2.3.11										
2.3.11.1	S & A Material Submittals	\$0	\$0	\$0	19Apr07	17May07	22d											2.3.11.1										
2.3.11.2	Fab and Del.	\$0	\$0	\$0	18May07	08Jun07	22d											2.3.11.2										
2.3.11.3	SC: Delayed Start of elec.	\$0	\$0	\$0	11Jun07	20Aug07	22d											2.3.11.3										
2.3.11.4	Rough In Power & Lighting EI 731	\$45,322	\$0	\$45,322	21Aug07	04Sep07	22d											2.3.11.4										
2.3.11.5	Rough In Power & Lighting EI 746'-6	\$11,114	\$0	\$11,114	05Sep07	25Sep07	22d											2.3.11.5										
2.3.11.6	Rough In Power & Lighting EI. 755'-4	\$24,977	\$0	\$24,977	26Sep07	09Oct07	22d											2.3.11.6										
2.3.11.7	Rough In Power & Lighting EI 766'-0	\$27,222	\$0	\$27,222	10Oct07	23Oct07	42d											2.3.11.7										
2.3.11.8	Trim Out House Power EI 731'-0	\$45,322	\$0	\$45,322	10Oct07	23Oct07	22d											2.3.11.8										
2.3.11.9	Trim Out Power & Lighting EI 746'-6	\$11,114	\$0	\$11,114	24Oct07	06Nov07	22d											2.3.11.9										
2.3.11.10	Trim Out Power & Lighting EI. 755'-4	\$24,977	\$0	\$24,977	07Nov07	20Nov07	22d											2.3.11.10										
2.3.11.11	Trim Out Power & Lighting EI 766'-0	\$27,222	\$0	\$27,222	21Nov07	06Dec07	22d											2.3.11.11										
2.3.12	Side Bay Computer Power	\$205,411	\$0	\$205,411	07Dec07	12Feb08	22d											2.3.12										
2.3.12.1	Install User Panels EI 746'-6	\$73,474	\$0	\$73,474	07Dec07	18Dec07	22d											2.3.12.1										
2.3.12.2	ECP-02 Elec Trigger Mods	\$21,336	\$0	\$21,336	19Dec07	26Dec07	22d											2.3.12.2										
2.3.12.3	Install User Panels EI. 766'-0	\$110,601	\$0	\$110,601	27Dec07	28Jan08	22d											2.3.12.3										
2.3.12.4	Phase 2 Ready By	\$0	\$0	\$0	29Jan08	12Feb08	57d											2.3.12.4										
2.3.13	Underfloor Fire Protection	\$38,030	\$0	\$38,030	17Jul07	23Jul07	129d											2.3.13										
2.3.13.1	Underfloor FP at EI 746'-6"	\$19,015	\$0	\$19,015	17Jul07	23Jul07	129d											2.3.13.1										
2.3.13.2	Underfloor FP @ EI 766'	\$19,015	\$0	\$19,015	17Jul07	23Jul07	149d											2.3.13.2										

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05					FY06					FY07					FY08					FY09																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
2.3.14	Coll. Hall	\$58,929	\$0	\$58,929	02Jul07	30Jul07	43d																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
3.3.5	IR Primary Power	\$241,654	\$0	\$241,654	19Sep06	03Apr07	226d			3.3.5			
3.3.5.1	SC: Delayed Start of IR	\$0	\$0	\$0	19Sep06	13Nov06	236d			3.3.5.1			
3.3.5.2	Install Duct Bank B-4	\$44,117	\$0	\$44,117	14Nov06	29Nov06	236d			3.3.5.2			
3.3.5.3	Install Duct Bank C-0	\$66,604	\$0	\$66,604	30Nov06	13Dec06	236d			3.3.5.3			
3.3.5.4	Install Duct Bank C-1	\$35,439	\$0	\$35,439	14Dec06	28Dec06	240d			3.3.5.4			
3.3.5.5	Install Transformer Pad B-4	\$11,458	\$0	\$11,458	30Nov06	06Dec06	241d			3.3.5.5			
3.3.5.6	Install Transformer Pad C-0	\$31,512	\$0	\$31,512	14Dec06	04Jan07	236d			3.3.5.6			
3.3.5.7	Install Transformer Pad C-1	\$11,458	\$0	\$11,458	05Jan07	11Jan07	236d			3.3.5.7			
3.3.5.8	Install Transformer B-4	\$6,960	\$0	\$6,960	09Jan07	12Jan07	252d			3.3.5.8			
3.3.5.9	Install Transformer C-0	\$13,920	\$0	\$13,920	06Feb07	09Feb07	237d			3.3.5.9			
3.3.5.10	Install Transformer C-1	\$6,960	\$0	\$6,960	13Feb07	16Feb07	236d			3.3.5.10			
3.3.5.11	Install Panel boards	\$13,224	\$0	\$13,224	30Nov06	28Dec06	270d			3.3.5.11			
3.3.5.12	Pull 13.8 KV Primary, splice and wrap B-4	\$0	\$0	\$0	02Feb07	12Feb07	226d			3.3.5.12			
3.3.5.13	Pull 13.8 KV Primary, splice and wrap C-0	\$0	\$0	\$0	13Feb07	21Feb07	226d			3.3.5.13			
3.3.5.14	Pull 13.8 KV Primary, splice and wrap C-1	\$0	\$0	\$0	22Feb07	02Mar07	226d			3.3.5.14			
3.3.5.15	Pull and terminate secondary	\$0	\$0	\$0	05Mar07	09Mar07	226d			3.3.5.15			
3.3.5.16	Clean Transformers	\$0	\$0	\$0	12Mar07	14Mar07	226d			3.3.5.16			
3.3.5.17	Testing	\$0	\$0	\$0	15Mar07	19Mar07	226d			3.3.5.17			
3.3.5.18	Punch List	\$0	\$0	\$0	20Mar07	02Apr07	226d			3.3.5.18			
3.3.5.19	C Sector H V Ready By	\$0	\$0	\$0	03Apr07	03Apr07	226d			3.3.5.19			
4	Pre Procured Items	\$625,337	\$38,347	\$663,684	01Apr05	05Oct06	102d	4					
4.1	Procure Item EDIA FESS	\$0	\$38,347	\$38,347	01Apr05	29Apr05	112d	4.1					
4.2	Write procured item specs	\$0	\$0	\$0	02May05	13Jun05	112d	4.2					
4.3	SC: Delay RFP's	\$0	\$0	\$0	14Jun05	09Aug05	112d	4.3					
4.4	Bid and award cable	\$0	\$0	\$0	10Aug05	07Oct05	112d	4.4					
4.5	Phase 1 Cable Procure and delivery	\$16,441	\$0	\$16,441	10Oct05	31Jan06	112d	4.5					
4.6	C Sector Cable procure and delivery	\$246,617	\$0	\$246,617	19Apr06	05Oct06	256d		4.6				
4.7	Bid and award transformers	\$0	\$0	\$0	14Jun05	11Aug05	137d	4.7					
4.8	Phase 1 Transformer Procure and Deliver	\$61,480	\$0	\$61,480	03Oct05	14Feb06	102d	4.8					
4.9	C SectorTrans. procure and delivery	\$242,440	\$0	\$242,440	19Apr06	15Sep06	329d		4.9				
4.10	Bid and award Air switch	\$0	\$0	\$0	14Jun05	11Aug05	156d	4.10					
4.11	Phase 1 4-Bay Switch Procure and Delivery	\$29,179	\$0	\$29,179	03Oct05	17Jan06	121d	4.11					
4.12	C Sector 4-Bay Switch procure and delivery	\$29,178	\$0	\$29,178	19Apr06	03Aug06	359d		4.12				
5	CDR, ACDR, & Project Reviews	\$80,904	\$260,846	\$341,751	01Oct03	10Mar05	0						

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
5.3	FY05 Fess Engineering	\$0	\$57,984	\$57,984	01Oct04	10Mar05	15d						
5.4	FY05 Consultant Engineer	\$0	\$0	\$0	01Oct04	10Mar05	15d						
6	Milestones	\$0	\$0	\$0	01Oct03	30Jun11	0						
6.1	Inter-Subproject link Milestones	\$0	\$0	\$0	01Oct03	30Sep10	0						
6.1.2	Construction Phase Milestones	\$0	\$0	\$0	01Oct04	30Sep10	0						
6.1.2.1	Lk3M: Start FY05	\$0	\$0	\$0	01Oct04	01Oct04	0						
6.1.2.2	Lk3M: Start FY05 Shutdown	\$0	\$0	\$0	08Aug05	08Aug05	0						
6.1.2.3	Lk3M: End FY05 Shutdown	\$0	\$0	\$0	30Sep05	30Sep05	0						
6.1.2.4	Lk3M: End Y05	\$0	\$0	\$0	30Sep05	30Sep05	0						
6.1.2.5	Lk3M: Start FY06	\$0	\$0	\$0	01Oct05	01Oct05	0						
6.1.2.6	Lk3M: Start FY06 Shutdown	\$0	\$0	\$0	07Aug06	07Aug06	0						
6.1.2.7	Lk3M: End FY06 Shutdown	\$0	\$0	\$0	29Sep06	29Sep06	0						
6.1.2.8	Lk3M: End FY06	\$0	\$0	\$0	29Sep06	29Sep06	0						
6.1.2.9	Lk3M: Start FY07	\$0	\$0	\$0	01Oct06	01Oct06	0						
6.1.2.10	Lk3M: Start FY07 Shutdown	\$0	\$0	\$0	06Aug07	06Aug07	0						
6.1.2.11	Lk3M: End FY07 Shutdown	\$0	\$0	\$0	28Sep07	28Sep07	0						
6.1.2.12	Lk3M: End FY07	\$0	\$0	\$0	30Sep07	30Sep07	0						
6.1.2.13	Lk3M: Start FY08	\$0	\$0	\$0	01Oct08	01Oct08	0						
6.1.2.14	Lk3M: Start FY08 Shutdown	\$0	\$0	\$0	04Aug08	04Aug08	0						
6.1.2.15	Lk3M: End FY08 Shutdown	\$0	\$0	\$0	26Sep08	26Sep08	0						
6.1.2.16	Lk3M: End FY08	\$0	\$0	\$0	30Sep08	30Sep08	0						
6.1.2.17	Lk3M: Start FY09	\$0	\$0	\$0	01Oct08	01Oct08	0						
6.1.2.18	Lk3M: Start FY09 Shutdown	\$0	\$0	\$0	03Aug09	03Aug09	0						
6.1.2.19	Lk3M: End FY09 Shutdown	\$0	\$0	\$0	30Nov09	30Nov09	0						
6.1.2.20	Lk3M: End FY09	\$0	\$0	\$0	30Sep09	30Sep09	0						
6.1.2.21	Lk3M: Start FY10	\$0	\$0	\$0	01Oct09	01Oct09	0						
6.1.2.22	Lk3M: Start Final Installation Shutdown	\$0	\$0	\$0	02Jul10	02Jul10	0						
6.1.2.23	Lk3M: End Final Installation Shutdown	\$0	\$0	\$0	30Sep10	30Sep10	0						
6.1.2.24	Lk3M: End Construction Phase	\$0	\$0	\$0	30Sep10	30Sep10	0						
6.1.2.25	Lk3M: End FY10	\$0	\$0	\$0	30Sep10	30Sep10	0						
6.2	DOE, Fermilab and BTeV Management Milestones	\$0	\$0	\$0	17Feb04	30Jun11	0						
6.2.1	Tier 0 DOE Headquarters CD Milestones	\$0	\$0	\$0	17Feb04	30Jun11	0						
6.2.1.2	T0M: CD-1 Approve Preliminary Baseline Range	\$0	\$0	\$0	30Dec04	30Dec04	0						
6.2.1.3	T0M: CD-2 Approve Performance Baseline	\$0	\$0	\$0	31Mar05	31Mar05	0						
6.2.1.4	T0M: CD-3a Approve Limited Construction	\$0	\$0	\$0	31Mar05	31Mar05	0						

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05			FY06			FY07			FY08			FY09	
6.2.1.5	T0M: CD-3b Approve Start of Construction	\$0	\$0	\$0	30Sep05	30Sep05	0				6.2.1.5										
6.2.1.6	T0M: CD-4 Approve Start of Ops - Project Closeout	\$0	\$0	\$0	30Jun11	30Jun11	0														
6.2.2	Tier 1DOE Headquarters Milestones	\$0	\$0	\$0	28Jul06	28Jul06	0					6.2.2									
6.2.2.1	T1M-2: Occupancy: C0 low lvl, upper staging area	\$0	\$0	\$0	28Jul06	28Jul06	0					6.2.2.1									
6.2.3	Tier 2 DOE Chicago Milestones	\$0	\$0	\$0	02Jun05	01May08	0			6.2.3											
6.2.3.1	T2M-23: Start C0 Outfitting construction	\$0	\$0	\$0	02Jun05	02Jun05	0			6.2.3.1											
6.2.3.2	T2M-24: Occupancy: C0 low lvl, upper staging area	\$0	\$0	\$0	28Jul06	28Jul06	0					6.2.3.2									
6.2.3.3	T2M-25: C0 Outfitting construction complete	\$0	\$0	\$0	01May08	01May08	0											6.2.3.3			
6.2.4	Tier 3 Fermilab Directorate, BTeV Mgmt. Milestones	\$0	\$0	\$0	01Jun05	01May08	0			6.2.4											
6.2.4.1	T3M-84: Start C0 Outfitting construction	\$0	\$0	\$0	01Jun05	01Jun05	0			6.2.4.1											
6.2.4.2	T3M-85: Occupancy: C0 low lvl, upper staging area	\$0	\$0	\$0	28Jul06	28Jul06	0					6.2.4.2									
6.2.4.3	T3M-86: Collision Hall completed	\$0	\$0	\$0	31Jan08	31Jan08	0											6.2.4.3			
6.2.4.4	T3M-87: Assy, Service Bldg construction completed	\$0	\$0	\$0	01May08	01May08	0											6.2.4.4			
7	EarlyTarget Ready By Dates	\$0	\$0	\$0	02Feb05	01Apr08	22d			7											
7.1	T5M: MS-1 Start Engineering	\$0	\$0	\$0	02Feb05	02Feb05	110d			7.1											
7.2	T4M: MS-2 Start Construction	\$0	\$0	\$0	04May05	04May05	45d			7.2											
7.3	T5M: MS-3 Side Bay. Struct. Complete	\$0	\$0	\$0	17Oct05	17Oct05	48d					7.3									
7.4	T5M: MS-4 Temo Power Operational (Fdr 45)	\$0	\$0	\$0	05Jun06	05Jun06	37d					7.4									
7.5	T4M: MS-5 Beneficial occupancy of lower level and upper staging area	\$0	\$0	\$0	19May06	19May06	48d					7.5									
7.6	T5M: MS-6 Collision Hall Complete	\$0	\$0	\$0	30Jul07	30Jul07	43d							7.6							
7.7	T5M: MS-7 Mechancal Systems Complete (Except CH)	\$0	\$0	\$0	02Oct07	02Oct07	99d							7.7							
7.8	T5M: MS-8 Electrical Systems Complete	\$0	\$0	\$0	28Jan08	28Jan08	22d											7.8			
7.9	T4M: MS-9 Assembly, Service Building Construction Complete	\$0	\$0	\$0	28Jan08	28Jan08	22d											7.9			
7.10	T5M: MS-10 Engineering Complete	\$0	\$0	\$0	01Apr08	01Apr08	22d											7.10			

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

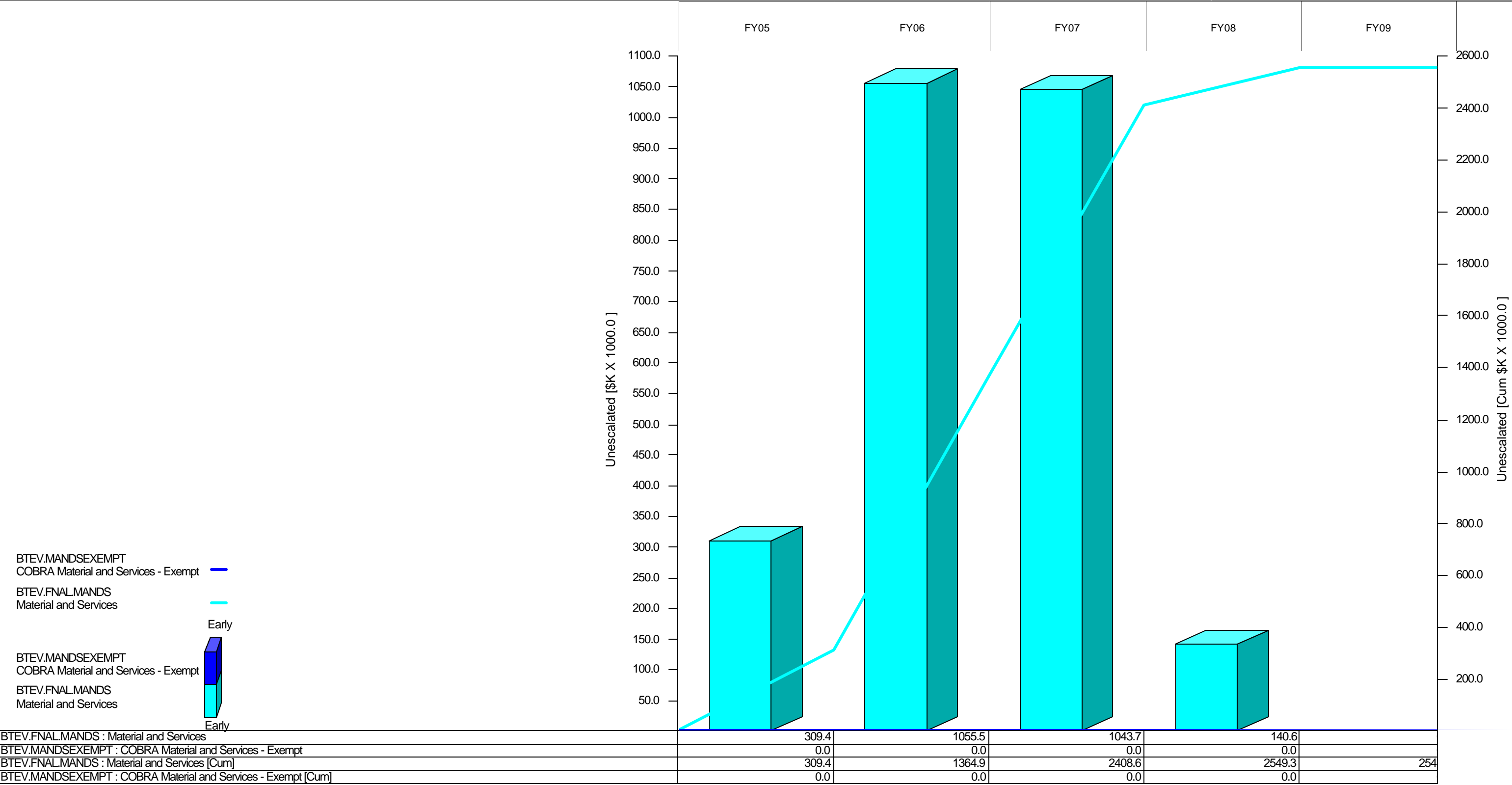
Late Dates

Milestone

Progress

Summary

Float



Obligation Schedule

Immediately follows this page

BTeV - WBS 3.0 C0 Building Outfitting								30Nov04		Planned		Critical		Late Dates		Milestone		Progress		Summary		Float	
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year																							
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead																							
Non-Fermilab Labor: Salary, Benefits & Overhead																							
Contingency Not Included, Material Burdened																							
Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05		FY06		FY07		FY08		FY09							
1	C-0 Outfitting Phase 1	\$1,737,180	\$276,404	\$2,013,585	04Jan05	26Apr06	64d	1															
1.1	Design to Award C-0 Phase 1	\$0	\$0	\$0	04Jan05	05Apr05	64d	1.1															
1.1.1	SC: Delay Proj. Start	\$0	\$0	\$0	04Jan05	04Jan05	64d	1.1.1															
1.1.2	Title II EDIA FESS Phase 1	\$0	\$0	\$0	04Jan05	01Feb05	64d	1.1.2															
1.1.3	Title II EDIA Consultant Phase 1	\$0	\$0	\$0	11Jan05	01Feb05	64d	1.1.3															
1.1.4	Construction Req.	\$0	\$0	\$0	02Feb05	08Feb05	64d	1.1.4															
1.1.5	Release for Bid	\$0	\$0	\$0	09Feb05	15Feb05	64d	1.1.5															
1.1.6	Pre-Bid Meeting	\$0	\$0	\$0	09Mar05	09Mar05	78d	1.1.6															
1.1.7	Establish Source Criteria	\$0	\$0	\$0	16Mar05	18Mar05	74d	1.1.7															
1.1.8	Receive Proposals	\$0	\$0	\$0	16Feb05	15Mar05	64d	1.1.8															
1.1.9	Source Selection & Award	\$0	\$0	\$0	16Mar05	05Apr05	64d	1.1.9															
1.2	Title 3 EDIA C-0 Outfitting Phase 1	\$9,551	\$276,404	\$285,956	06Apr05	19Apr06	69d	1.2															
1.2.1	Engineering Effort	\$6,651	\$276,404	\$283,056	06Apr05	19Apr06	69d	1.2.1															
1.2.2	Work Force Safety Promotions	\$2,900	\$0	\$2,900	06Apr05	19Apr06	69d	1.2.2															
1.3	C-0 Outfitting Phase 1 Construction Contract	\$1,727,628	\$0	\$1,727,628	01Apr05	26Apr06	64d	1.3															
1.3.1	SC: Delayed Const. Start	\$0	\$0	\$0	01Apr05	01Apr05	67d	1.3.1															
1.3.2	Notice to Proceed	\$0	\$0	\$0	06Apr05	06Apr05	64d	1.3.2															
1.3.3	Mobilize	\$18,580	\$0	\$18,580	07Apr05	20Apr05	64d	1.3.3															
1.3.4	Site Concrete	\$30,423	\$0	\$30,423	21Apr05	23Jun05	95d	1.3.4															
1.3.4.1	S & A Concrete Mix	\$0	\$0	\$0	21Apr05	19May05	95d	1.3.4.1															
1.3.4.2	S & A Rebar	\$0	\$0	\$0	21Apr05	19May05	95d	1.3.4.2															
1.3.4.3	FBP Foundations at Stair	\$7,047	\$0	\$7,047	20May05	31May05	95d	1.3.4.3															
1.3.4.4	Construct Hardstands	\$14,227	\$0	\$14,227	01Jun05	14Jun05	95d	1.3.4.4															
1.3.4.5	Site Utilities	\$5,568	\$0	\$5,568	15Jun05	23Jun05	95d	1.3.4.5															
1.3.4.6	Rework Temp Power	\$0	\$0	\$0	21Apr05	11May05	122d	1.3.4.6															
1.3.4.7	Demo Int. Stair Enclosure	\$3,580	\$0	\$3,580	12May05	16May05	122d	1.3.4.7															
1.3.5	Structural Steel & Weather Enclosures	\$236,396	\$0	\$236,396	21Apr05	07Oct05	90d	1.3.5															
1.3.5.1	S & A Steel Shop Drawings	\$0	\$0	\$0	21Apr05	18May05	90d	1.3.5.1															
1.3.5.2	Fab and ship Steel	\$0	\$0	\$0	19May05	30Jun05	90d	1.3.5.2															
1.3.5.3	Mezzanine Structural Steel	\$65,774	\$0	\$65,774	01Jul05	15Jul05	90d	1.3.5.3															
1.3.5.4	Structural Steel at Stair #3	\$20,052	\$0	\$20,052	01Jul05	13Jul05	130d	1.3.5.4															
1.3.5.5	Install Steel Stairs and misc.	\$42,019	\$0	\$42,019	09Sep05	14Sep05	90d	1.3.5.5															
1.3.5.6	Siding & Roofing	\$108,549	\$0	\$108,549	15Sep05	07Oct05	90d	1.3.5.6															
1.3.6	Structural Concrete	\$132,940	\$0	\$132,940	21Apr05	08Sep05	90d	1.3.6															
1.3.6.1	S & A Rebar and Tendons.	\$0	\$0	\$0	21Apr05	10May05	122d	1.3.6.1															
1.3.6.2	Fab Rebar and Tendons	\$0	\$0	\$0	11May05	31May05	122d	1.3.6.2															
1.3.6.3	FBP Concrete @ El. 755'	\$66,470	\$0	\$66,470	18Jul05	11Aug05	90d	1.3.6.3															
1.3.6.4	FBP Concrete @ El 764'	\$66,470	\$0	\$66,470	12Aug05	08Sep05	90d	1.3.6.4															
BTeV30_ALLPRO								1 of 11															
								WBS3_0															

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05				FY06				FY07				FY08				FY09				
1.3.7	Concrete Masonry	\$160,167	\$0	\$160,167	21Apr05	06Dec05	90d																					
1.3.7.1	S & A Masonry SD	\$0	\$0	\$0	21Apr05	19May05	138d																					
1.3.7.2	S & A Doors and Glass	\$0	\$0	\$0	20May05	20Jun05	138d																					
1.3.7.3	Concrete Masonry EI 715-0	\$11,113	\$0	\$11,113	21Jun05	01Jul05	138d																					
1.3.7.4	Concrete Masonry EI 731'-4	\$16,670	\$0	\$16,670	09Sep05	29Sep05	96d																					
1.3.7.5	Concrete Masonry EI 746-6	\$36,893	\$0	\$36,893	10Oct05	31Oct05	90d																					
1.3.7.6	Concrete Masonry EI 755-4	\$27,784	\$0	\$27,784	01Nov05	11Nov05	90d																					
1.3.7.7	Concrete Masonry EI 766-0	\$27,784	\$0	\$27,784	14Nov05	28Nov05	90d																					
1.3.7.8	Install Doors and Glass	\$39,920	\$0	\$39,920	29Nov05	06Dec05	126d																					
1.3.8	Conveying System	\$152,488	\$0	\$152,488	21Apr05	14Dec05	110d																					
1.3.8.1	S & A Elevator SD	\$0	\$0	\$0	21Apr05	30Jun05	163d																					
1.3.8.2	Fab and Del elev Rails	\$0	\$0	\$0	01Jul05	05Aug05	163d																					
1.3.8.3	Install elev rails	\$28,400	\$0	\$28,400	08Aug05	19Aug05	163d																					
1.3.8.4	Install Elevator Machine Rm	\$56,801	\$0	\$56,801	22Aug05	12Sep05	163d																					
1.3.8.5	Demo Roof	\$1,185	\$0	\$1,185	09Sep05	12Sep05	153d																					
1.3.8.6	Frame, Side & Roof Elevator Head house	\$9,301	\$0	\$9,301	13Sep05	26Sep05	153d																					
1.3.8.7	Install Elevator Cab	\$56,801	\$0	\$56,801	29Nov05	12Dec05	110d																					
1.3.8.8	Energize and Test Elevator	\$0	\$0	\$0	13Dec05	14Dec05	110d																					
1.3.9	Finishes	\$80,428	\$0	\$80,428	14Oct05	09Jan06	110d																					
1.3.9.1	Paint Block Walls	\$18,769	\$0	\$18,769	15Dec05	28Dec05	110d																					
1.3.9.2	Painting including Doors & Glass Frames	\$10,959	\$0	\$10,959	29Dec05	03Jan06	110d																					
1.3.9.3	Rough In Toilet Rm Plumbing	\$23,498	\$0	\$23,498	14Oct05	10Nov05	124d																					
1.3.9.4	Toilet RM Walls	\$0	\$0	\$0	11Nov05	21Nov05	124d																					
1.3.9.5	Toilet Rm Finishes	\$0	\$0	\$0	22Nov05	14Dec05	124d																					
1.3.9.6	Trim out Toilet Rm. Fixtures	\$23,498	\$0	\$23,498	04Jan06	09Jan06	110d																					
1.3.9.7	Install Toilet Room Exhaust	\$3,704	\$0	\$3,704	11Nov05	14Nov05	129d																					
1.3.10	Fire Protection	\$96,654	\$0	\$96,654	29Nov05	25Jan06	90d																					
1.3.10.1	SC: Delay Start of FP	\$0	\$0	\$0	29Nov05	29Nov05	90d																					
1.3.10.2	Install Fire Riser to High Bay	\$8,406	\$0	\$8,406	29Nov05	02Dec05	90d																					
1.3.10.3	Install Fire Riser to Side bay	\$8,406	\$0	\$8,406	05Dec05	08Dec05	90d																					
1.3.10.4	Rough In Sprinklers EI 731'-4"	\$8,406	\$0	\$8,406	09Dec05	15Dec05	90d																					
1.3.10.5	Rough In sprinklers EI 746'-6	\$12,604	\$0	\$12,604	16Dec05	29Dec05	97d																					
1.3.10.6	Rough In Sprinklers EI.755'-4	\$12,604	\$0	\$12,604	30Dec05	05Jan06	102d																					
1.3.10.7	Rough In Sprinklers EI 766'-0	\$12,604	\$0	\$12,604	06Jan06	19Jan06	102d																					
1.3.10.8	Trim Out Sprinklers EI 731'-4"	\$8,406	\$0	\$8,406	16Dec05	21Dec05	90d																					
1.3.10.9	Trim Out sprinklers EI 746'-6	\$8,406	\$0	\$8,406	30Dec05	04Jan06	97d																					
1.3.10.10	Trim Out Sprinklers EI.755'-4	\$8,406	\$0	\$8,406	06Jan06	11Jan06	102d																					
1.3.10.11	Trim Out Sprinklers EI 766'-0	\$8,406	\$0	\$8,406	20Jan06	25Jan06	102d																					

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
1.3.11	Fire Detection	\$88,905	\$0	\$88,905	22Dec05	07Mar06	90d		1.3.11				
1.3.11.1	Fire Detection EI 731'-4"	\$9,878	\$0	\$9,878	22Dec05	13Jan06	90d		1.3.11.1				
1.3.11.2	Fire Detection EI 746'-6	\$19,757	\$0	\$19,757	16Jan06	27Jan06	90d		1.3.11.2				
1.3.11.3	Fire Detection EI.755'-4	\$19,757	\$0	\$19,757	30Jan06	10Feb06	90d		1.3.11.3				
1.3.11.4	Fire Detection EI 766'-0	\$19,757	\$0	\$19,757	13Feb06	24Feb06	90d		1.3.11.4				
1.3.11.5	Upgrade Fire Control Panel	\$9,878	\$0	\$9,878	27Feb06	02Mar06	90d		1.3.11.5				
1.3.11.6	TestI Fire Detection	\$9,878	\$0	\$9,878	03Mar06	07Mar06	90d		1.3.11.6				
1.3.12	Power Distribution and Lighting	\$171,276	\$0	\$171,276	21Apr05	23Feb06	64d	1.3.12					
1.3.12.1	S & A Electrical Devices	\$0	\$0	\$0	21Apr05	15Jul05	64d	1.3.12.1					
1.3.12.2	Rough In House Power EI 715'-0	\$80,659	\$0	\$80,659	18Jul05	19Aug05	168d	1.3.12.2					
1.3.12.3	Trim Out House Power EI 715'-0	\$80,659	\$0	\$80,659	22Aug05	19Sep05	168d	1.3.12.3					
1.3.12.4	Install Exist. 2000 Amp Switchbd	\$9,958	\$0	\$9,958	05Jan06	24Jan06	108d	1.3.12.4					
1.3.12.5	Pull and terminate secondary	\$0	\$0	\$0	25Jan06	23Feb06	108d	1.3.12.5					
1.3.13	Feeder From B-4 to C-0	\$437,067	\$0	\$437,067	18Jul05	26Apr06	64d	1.3.13					
1.3.13.1	Concrete and Rebar SD	\$0	\$0	\$0	18Jul05	15Aug05	64d	1.3.13.1					
1.3.13.2	Install Duct bank B-4 to Berm	\$42,838	\$0	\$42,838	23Dec05	02Jan06	64d	1.3.13.2					
1.3.13.3	Jack Carrier pipe thru berm	\$21,420	\$0	\$21,420	03Jan06	11Jan06	64d	1.3.13.3					
1.3.13.4	Manhole	\$20,880	\$0	\$20,880	12Jan06	18Jan06	64d	1.3.13.4					
1.3.13.5	Install duct bank berm to C-0 Pad	\$42,838	\$0	\$42,838	19Jan06	06Feb06	64d	1.3.13.5					
1.3.13.6	Install secondary duct bank	\$149,908	\$0	\$149,908	07Feb06	17Feb06	64d	1.3.13.6					
1.3.13.7	Install Pad, C-0 Test Area	\$53,652	\$0	\$53,652	20Feb06	28Feb06	64d	1.3.13.7					
1.3.13.8	Install switch Pad at B-4	\$0	\$0	\$0	01Mar06	08Mar06	64d	1.3.13.8					
1.3.13.9	Set switch at B-4	\$2,400	\$0	\$2,400	07Apr06	07Apr06	64d	1.3.13.9					
1.3.13.10	Set Transformers C-0	\$25,200	\$0	\$25,200	22Mar06	24Mar06	77d	1.3.13.10					
1.3.13.11	Set Switch C-0 Test	\$2,400	\$0	\$2,400	30Mar06	30Mar06	70d	1.3.13.11					
1.3.13.12	Set Generator C-0 Test	\$75,531	\$0	\$75,531	30Mar06	30Mar06	70d	1.3.13.12					
1.3.13.13	Pull Feeder B-4 to C-0 Test Area	\$0	\$0	\$0	10Apr06	12Apr06	64d	1.3.13.13					
1.3.13.14	Terminate Primary	\$0	\$0	\$0	13Apr06	13Apr06	64d	1.3.13.14					
1.3.13.15	Punch List (Excluding Elec.)	\$0	\$0	\$0	08Mar06	21Mar06	90d	1.3.13.15					
1.3.13.16	Phase 1 Ben. Occ. Ready By	\$0	\$0	\$0	22Mar06	22Mar06	90d	1.3.13.16					
1.3.13.17	Phase 1 Complete	\$0	\$0	\$0	14Apr06	26Apr06	64d	1.3.13.17					
1.3.14	Phase 1 Coll. Hall	\$122,302	\$0	\$122,302	01Aug05	26Aug05	234d	1.3.14					
1.3.14.1	Coll Hall Power	\$91,439	\$0	\$91,439	01Aug05	19Aug05	284d	1.3.14.1					
1.3.14.2	Fire Detection Collision Hall	\$9,878	\$0	\$9,878	01Aug05	12Aug05	289d	1.3.14.2					
1.3.14.3	Rerack Main Ring Manholes	\$20,985	\$0	\$20,985	08Aug05	26Aug05	234d	1.3.14.3					
2	C-0 Outfitting Phase 2	\$1,938,368	\$444,071	\$2,382,439	03Apr06	23Jul07	131d	2					
2.1	Design to Award C-0 Phase 2	\$46,400	\$187,185	\$233,585	03Apr06	12Dec06	131d	2.1					

BTev - WBS 3.0 C0 Building Outfitting										30Nov04										Planned								
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year																				Critical								
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead																				Late Dates								
Non-Fermilab Labor: Salary, Benefits & Overhead																				Milestone								
Contingency Not Included, Material Burdened																				Progress								
																				Summary								
																				Float								
Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05				FY06				FY07				FY08				FY09				
2.1.1	SC: Delayed Start of Eng.	\$0	\$0	\$0	03Apr06	03Apr06	163d									2.1.1												
2.1.2	Title II EDIA FESS	\$0	\$187,185	\$187,185	03Apr06	12Jun06	163d									2.1.2												
2.1.3	Title II EDIA Consultant	\$46,400	\$0	\$46,400	20Jun06	15Aug06	163d									2.1.3												
2.1.4	Construction Req.	\$0	\$0	\$0	02Oct06	06Oct06	131d										2.1.4											
2.1.5	Release for Bid	\$0	\$0	\$0	09Oct06	13Oct06	131d										2.1.5											
2.1.6	Pre- Bid Meeting	\$0	\$0	\$0	09Oct06	09Oct06	135d										2.1.6											
2.1.7	Establish Source Criteria	\$0	\$0	\$0	16Oct06	18Oct06	131d										2.1.7											
2.1.8	Receive Proposals	\$0	\$0	\$0	16Oct06	17Nov06	131d										2.1.8											
2.1.9	Source Selection& Award	\$0	\$0	\$0	20Nov06	12Dec06	131d										2.1.9											
2.2	Title 3 EDIA C-0 Outfitting Phase 2	\$2,900	\$256,885	\$259,785	13Dec06	17Jul07	199d										2.2											
2.2.1	Engineering Effort	\$0	\$256,885	\$256,885	13Dec06	17Jul07	199d										2.2.1											
2.2.2	Work Force Safety Promotions	\$2,900	\$0	\$2,900	13Dec06	17Jul07	199d										2.2.2											
2.3	C-0 Outfitting Phase 2 Construction Contract	\$1,889,068	\$0	\$1,889,068	13Dec06	23Jul07	131d										2.3											
2.3.1	SC: Delayed Start of Construction	\$0	\$0	\$0	13Dec06	13Dec06	131d										2.3.1											
2.3.2	Notice to Proceed	\$0	\$0	\$0	13Dec06	13Dec06	131d										2.3.2											
2.3.3	Mobilize	\$0	\$0	\$0	13Dec06	13Dec06	131d										2.3.3											
2.3.4	Site Concrete	\$114,016	\$0	\$114,016	13Dec06	27Feb07	222d										2.3.4											
2.3.4.1	FBP Chiller Pads	\$34,376	\$0	\$34,376	13Dec06	19Dec06	222d										2.3.4.1											
2.3.4.2	FBP Condenser Pads	\$51,565	\$0	\$51,565	20Dec06	29Dec06	222d										2.3.4.2											
2.3.4.3	Construct Gas House	\$28,074	\$0	\$28,074	12Feb07	27Feb07	286d										2.3.4.3											
2.3.5	Masonry	\$50,689	\$0	\$50,689	13Dec06	07Feb07	217d										2.3.5											
2.3.5.1	S & A Finishes	\$0	\$0	\$0	13Dec06	12Jan07	217d										2.3.5.1											
2.3.5.2	C-0 Service Bldg. Mods	\$11,728	\$0	\$11,728	16Jan07	24Jan07	300d										2.3.5.2											
2.3.5.3	C-0 SB Buss Duct Enclosure	\$38,960	\$0	\$38,960	25Jan07	07Feb07	300d										2.3.5.3											
2.3.6	Finishes	\$221,492	\$0	\$221,492	16Jan07	21May07	217d										2.3.6											
2.3.6.1	Fab and Deliver Finishes	\$0	\$0	\$0	16Jan07	12Mar07	217d										2.3.6.1											
2.3.6.2	Flooring & Carpeting EI 755'-4	\$16,536	\$0	\$16,536	13Mar07	16Mar07	218d										2.3.6.2											
2.3.6.3	Install Computer Floor EI 746'-6	\$72,842	\$0	\$72,842	20Mar07	02Apr07	217d										2.3.6.3											
2.3.6.4	Install Computer Floor EI. 766'-0	\$72,842	\$0	\$72,842	03Apr07	16Apr07	227d										2.3.6.4											
2.3.6.5	C-0 Service Bldg. Mods	\$59,271	\$0	\$59,271	17Apr07	21May07	227d										2.3.6.5											
2.3.7	HVAC System	\$403,829	\$0	\$403,829	13Dec06	05Jun07	131d										2.3.7											
2.3.7.1	S & A HVAC Units	\$0	\$0	\$0	13Dec06	12Jan07	131d										2.3.7.1											
2.3.7.2	F & D HVAC Units	\$0	\$0	\$0	16Jan07	26Feb07	131d										2.3.7.2											
2.3.7.3	SC: Delayed HVAC Start	\$0	\$0	\$0	27Feb07	27Feb07	252d										2.3.7.3											
2.3.7.4	Install HVAC Units Coll. Hall & Assem Hall	\$80,212	\$0	\$80,212	27Feb07	12Mar07	141d										2.3.7.4											
2.3.7.5	Install HVAC Units + Off & MUA	\$34,913	\$0	\$34,913	13Mar07	26Mar07	242d										2.3.7.5											
2.3.7.6	Duct Work	\$77,068	\$0	\$77,068	27Mar07	03Apr07	249d										2.3.7.6											

BTev30_ALLPRO

4 of 11

WBS3_0

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates -

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05					FY06					FY07					FY08					FY09					
2.3.7.7	Install Ductwk EI 755'-4"	\$14,323	\$0	\$14,323	27Mar07	09Apr07	242d												2.3.7.7														
2.3.7.8	Install Motorized Dampers and Louvers	\$14,323	\$0	\$14,323	27Mar07	02Apr07	247d												2.3.7.8														
2.3.7.9	Install Purge and return fan	\$18,522	\$0	\$18,522	18May07	18May07	217d												2.3.7.9														
2.3.7.10	Insulate Ductwork	\$37,044	\$0	\$37,044	03Apr07	06Apr07	247d												2.3.7.10														
2.3.7.12	Install Mech Room Exhaust	\$6,174	\$0	\$6,174	10Apr07	11Apr07	242d												2.3.7.12														
2.3.7.13	Install DCW pipe and Humidifier	\$14,818	\$0	\$14,818	12Apr07	13Apr07	242d												2.3.7.13														
2.3.7.14	Balance HVAC System, Assy, Off & MUA	\$5,704	\$0	\$5,704	21May07	22May07	217d												2.3.7.14														
2.3.7.15	Install Sensors and Controls	\$58,344	\$0	\$58,344	23May07	30May07	217d												2.3.7.15														
2.3.7.16	Start Up and Comm (Non Shutdownn Related)	\$19,244	\$0	\$19,244	31May07	05Jun07	217d												2.3.7.16														
2.3.7.17	Install CRAC Condensing Unit AC for EI 746	\$16,719	\$0	\$16,719	03Apr07	10Apr07	217d												2.3.7.17														
2.3.7.18	Install Ref Piping Test, Fill and Charge Ins and Startup	\$6,419	\$0	\$6,419	11Apr07	16Apr07	217d												2.3.7.18														
2.3.8	Chilled Water System (CHW)	\$311,353	\$0	\$311,353	13Dec06	29May07	187d												2.3.8														
2.3.8.1	S & A Chillers, W/ Controls	\$0	\$0	\$0	13Dec06	12Jan07	187d												2.3.8.1														
2.3.8.2	F & D Chillers W/ Controls	\$0	\$0	\$0	16Jan07	12Mar07	187d												2.3.8.2														
2.3.8.3	S & A Chilled Water Pumps	\$0	\$0	\$0	13Dec06	12Jan07	191d												2.3.8.3														
2.3.8.4	F & D Chilled Water Pumps	\$0	\$0	\$0	16Jan07	06Mar07	191d												2.3.8.4														
2.3.8.5	SC: Delayed Chiller Equip.	\$0	\$0	\$0	13Mar07	13Mar07	187d												2.3.8.5														
2.3.8.6	Install Chillers	\$110,416	\$0	\$110,416	13Mar07	15Mar07	189d												2.3.8.6														
2.3.8.7	Install Chilled Water Pumps	\$4,229	\$0	\$4,229	13Mar07	19Mar07	187d												2.3.8.7														
2.3.8.8	Install CHW piping supports and Fittings	\$43,909	\$0	\$43,909	20Mar07	02Apr07	187d												2.3.8.8														
2.3.8.9	Install Tanks and Other Hydronic items	\$11,082	\$0	\$11,082	03Apr07	16Apr07	187d												2.3.8.9														
2.3.8.10	Install ECW pipe header on 746 Comp Rm.	\$17,100	\$0	\$17,100	17Apr07	24Apr07	187d												2.3.8.10														
2.3.8.11	ECP -02 Trigger Add. CHW	\$30,258	\$0	\$30,258	25Apr07	25Apr07	187d												2.3.8.11														
2.3.8.12	Leak test and Insulate ECW Header	\$5,700	\$0	\$5,700	26Apr07	01May07	187d												2.3.8.12														
2.3.8.13	Leak test & Insulate CHW	\$9,567	\$0	\$9,567	02May07	09May07	187d												2.3.8.13														
2.3.8.14	Install Sensors and Controls	\$49,593	\$0	\$49,593	10May07	17May07	187d												2.3.8.14														
2.3.8.15	Flush tag and Fill System	\$3,704	\$0	\$3,704	18May07	18May07	187d												2.3.8.15														
2.3.8.16	Startup & Bal CHW	\$3,257	\$0	\$3,257	21May07	21May07	187d												2.3.8.16														
2.3.8.17	Comm and Training	\$22,538	\$0	\$22,538	22May07	29May07	187d												2.3.8.17														
2.3.9	High Density Computer Cooling	\$235,183	\$0	\$235,183	13Dec06	04Apr07	183d												2.3.9														
2.3.9.1	S & A Computer Rm. Air Handlers	\$0	\$0	\$0	13Dec06	12Jan07	183d												2.3.9.1														
2.3.9.2	F & D Computer Room Air handlers	\$0	\$0	\$0	16Jan07	26Feb07	183d												2.3.9.2														

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05					FY06					FY07					FY08					FY09					
2.3.9.3	Install Comp. Rm Condensers pad mnt.	\$81,497	\$0	\$81,497	27Feb07	14Mar07	183d											2.3.9.3															
2.3.9.4	Install Comp room Air handlers EI; 766	\$93,143	\$0	\$93,143	27Feb07	14Mar07	183d											2.3.9.4															
2.3.9.5	Ref. Piping CRAC	\$14,818	\$0	\$14,818	27Feb07	08Mar07	187d											2.3.9.5															
2.3.9.6	Leak Test and Charge Ref Piping	\$3,754	\$0	\$3,754	15Mar07	20Mar07	183d											2.3.9.6															
2.3.9.7	Install DCW & Humidifier	\$11,113	\$0	\$11,113	21Mar07	22Mar07	183d											2.3.9.7															
2.3.9.8	Insulate and Tag Piping	\$14,510	\$0	\$14,510	23Mar07	27Mar07	183d											2.3.9.8															
2.3.9.9	Install Controls	\$12,965	\$0	\$12,965	28Mar07	02Apr07	183d											2.3.9.9															
2.3.9.10	Startup Balance Comm and Training	\$3,383	\$0	\$3,383	03Apr07	04Apr07	183d											2.3.9.10															
2.3.10	Motor Control Center (MCC)	\$32,863	\$0	\$32,863	13Dec06	26Mar07	184d											2.3.10															
2.3.10.1	S & A MCC	\$0	\$0	\$0	13Dec06	12Jan07	184d											2.3.10.1															
2.3.10.2	F & D Motor Control Center	\$0	\$0	\$0	16Jan07	26Feb07	184d											2.3.10.2															
2.3.10.3	Install Motor Control Center	\$32,863	\$0	\$32,863	27Feb07	26Mar07	184d											2.3.10.3															
2.3.11	Power Distribution and Lighting	\$217,270	\$0	\$217,270	13Dec06	21May07	160d											2.3.11															
2.3.11.1	S & A Material Submittals	\$0	\$0	\$0	13Dec06	12Jan07	160d											2.3.11.1															
2.3.11.2	Fab and Del.	\$0	\$0	\$0	16Jan07	05Feb07	160d											2.3.11.2															
2.3.11.3	SC: Delayed Start of elec.	\$0	\$0	\$0	06Feb07	06Feb07	160d											2.3.11.3															
2.3.11.4	Rough In Power & Lighting EI 731	\$45,322	\$0	\$45,322	06Feb07	19Feb07	160d											2.3.11.4															
2.3.11.5	Rough In Power & Lighting EI 746'-6	\$11,114	\$0	\$11,114	20Feb07	12Mar07	160d											2.3.11.5															
2.3.11.6	Rough In Power & Lighting EI. 755'-4	\$24,977	\$0	\$24,977	13Mar07	26Mar07	160d											2.3.11.6															
2.3.11.7	Rough In Power & Lighting EI 766'-0	\$27,222	\$0	\$27,222	27Mar07	09Apr07	180d											2.3.11.7															
2.3.11.8	Trim Out House Power EI 731'-0	\$45,322	\$0	\$45,322	27Mar07	09Apr07	160d											2.3.11.8															
2.3.11.9	Trim Out Power & Lighting EI 746'-6	\$11,114	\$0	\$11,114	10Apr07	23Apr07	160d											2.3.11.9															
2.3.11.10	Trim Out Power & Lighting EI. 755'-4	\$24,977	\$0	\$24,977	24Apr07	07May07	160d											2.3.11.10															
2.3.11.11	Trim Out Power & Lighting EI 766'-0	\$27,222	\$0	\$27,222	08May07	21May07	160d											2.3.11.11															
2.3.12	Side Bay Computer Power	\$205,411	\$0	\$205,411	22May07	23Jul07	160d											2.3.12															
2.3.12.1	Install User Panels EI 746'-6	\$73,474	\$0	\$73,474	22May07	01Jun07	160d											2.3.12.1															
2.3.12.2	ECP-02 Elec Trigger Mods	\$21,336	\$0	\$21,336	04Jun07	07Jun07	160d											2.3.12.2															
2.3.12.3	Install User Panels EI. 766'-0	\$110,601	\$0	\$110,601	08Jun07	06Jul07	160d											2.3.12.3															
2.3.12.4	Phase 2 Ready By	\$0	\$0	\$0	09Jul07	23Jul07	195d											2.3.12.4															
2.3.13	Underfloor Fire Protection	\$38,030	\$0	\$38,030	13Mar07	19Mar07	217d											2.3.13															
2.3.13.1	Underfloor FP at EI 746'-6"	\$19,015	\$0	\$19,015	13Mar07	19Mar07	217d											2.3.13.1															
2.3.13.2	Underfloor FP @ EI 766'	\$19,015	\$0	\$19,015	13Mar07	19Mar07	237d											2.3.13.2															

BTeV - WBS 3.0 C0 Building Outfitting

Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year

Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead

Non-Fermilab Labor: Salary, Benefits & Overhead

Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

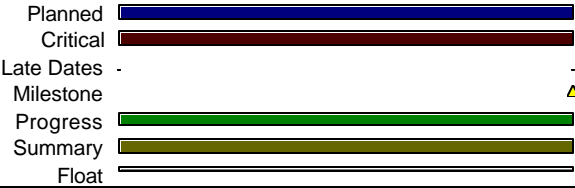
Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05					FY06					FY07					FY08					FY09					
2.3.14	Coll. Hall	\$58,929	\$0	\$58,929	27Feb07	26Mar07	131d													2.3.14													
2.3.14.1	Collision Hall work, (Duct, fancoil, Piping	\$37,241	\$0	\$37,241	27Feb07	01Mar07	131d													2.3.14.1													
2.3.14.2	Balance HVAC Sys. Col Hall	\$2,444	\$0	\$2,444	02Mar07	05Mar07	131d													2.3.14.2													
2.3.14.3	Start Up and Comm (Shutdown Related)	\$19,244	\$0	\$19,244	06Mar07	19Mar07	131d													2.3.14.3													
2.3.14.4	Commision Coll. Hall	\$0	\$0	\$0	20Mar07	26Mar07	131d													2.3.14.4													
3	C Sector High Voltage Power Upgrade	\$600,409	\$175,470	\$775,880	03Oct05	24Oct06	336d						3																				
3.1	Design to Award C Sector High Voltage	\$62,060	\$25,452	\$87,512	03Oct05	07Feb06	336d						3.1																				
3.1.1	SC: Delayed Start of Eng.	\$0	\$0	\$0	03Oct05	03Oct05	336d						3.1.1																				
3.1.2	Title II EDIA FESS Engineering	\$0	\$25,452	\$25,452	03Oct05	29Nov05	336d						3.1.2																				
3.1.3	Title II EDIA Consultant Eng.	\$62,060	\$0	\$62,060	03Oct05	29Nov05	336d						3.1.3																				
3.1.4	Construction Req.	\$0	\$0	\$0	30Nov05	13Dec05	336d						3.1.4																				
3.1.5	Release for Bid	\$0	\$0	\$0	14Dec05	27Dec05	336d						3.1.5																				
3.1.6	Pre- Bid Meeting	\$0	\$0	\$0	11Jan06	11Jan06	353d						3.1.6																				
3.1.7	Establish Source Criteria	\$0	\$0	\$0	12Jan06	13Jan06	353d						3.1.7																				
3.1.8	Receive Proposals	\$0	\$0	\$0	28Dec05	24Jan06	336d						3.1.8																				
3.1.9	Source Selection and Award	\$0	\$0	\$0	25Jan06	07Feb06	336d						3.1.9																				
3.2	Title 3 EDIA C Sector High Voltage	\$1,160	\$150,018	\$151,178	08Feb06	24Oct06	336d						3.2																				
3.2.1	Engineering Effort	\$0	\$150,018	\$150,018	08Feb06	24Oct06	336d						3.2.1																				
3.2.2	Work Force Safety Promotions	\$1,160	\$0	\$1,160	08Feb06	24Oct06	336d						3.2.2																				
3.3	C Sector High Voltage Const. Contract	\$537,189	\$0	\$537,189	08Feb06	26Sep06	336d						3.3																				
3.3.1	SC: Delayed Const Start	\$0	\$0	\$0	08Feb06	08Feb06	336d						3.3.1																				
3.3.2	Notice to Proceed	\$0	\$0	\$0	08Feb06	08Feb06	336d						3.3.2																				
3.3.3	Mobilize	\$0	\$0	\$0	09Feb06	01Mar06	406d						3.3.3																				
3.3.4	KRS to B-4	\$295,534	\$0	\$295,534	02Mar06	03Aug06	356d						3.3.4																				
3.3.4.1	SC: Delayed Pulling Cables	\$0	\$0	\$0	02Mar06	02Mar06	406d						3.3.4.1																				
3.3.4.2	Install Switch in KRS	\$38,253	\$0	\$38,253	02Mar06	06Mar06	406d						3.3.4.2																				
3.3.4.3	Pull Cable KRS to E2	\$38,253	\$0	\$38,253	16May06	30May06	356d						3.3.4.3																				
3.3.4.4	Pull Cable E2 to E-0	\$38,253	\$0	\$38,253	31May06	06Jun06	356d						3.3.4.4																				
3.3.4.5	Pull Cable E-0 to C-2	\$38,253	\$0	\$38,253	07Jun06	12Jun06	356d						3.3.4.5																				
3.3.4.6	Pull Cable C-2 to C-0	\$23,753	\$0	\$23,753	13Jun06	15Jun06	356d						3.3.4.6																				
3.3.4.7	Pull Cable C-0 to B-4	\$23,753	\$0	\$23,753	16Jun06	19Jun06	356d						3.3.4.7																				
3.3.4.8	Fire wrap E-2, E-0, D-2	\$23,753	\$0	\$23,753	20Jun06	10Jul06	356d						3.3.4.8																				
3.3.4.9	Fire wrap C-4, C-2, B-4	\$23,753	\$0	\$23,753	11Jul06	26Jul06	356d						3.3.4.9																				
3.3.4.10	Terminate in 4 way switch	\$23,753	\$0	\$23,753	27Jul06	28Jul06	393d						3.3.4.10																				
3.3.4.11	Splice to Feeder 49	\$11,877	\$0	\$11,877	31Jul06	01Aug06	393d						3.3.4.11																				
3.3.4.12	Test Cables	\$11,877	\$0	\$11,877	02Aug06	03Aug06	393d						3.3.4.12																				

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04



Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
3.3.5	IR Primary Power	\$241,654	\$0	\$241,654	02Mar06	26Sep06	356d		3.3.5				
3.3.5.1	SC: Delayed Start of IR	\$0	\$0	\$0	02Mar06	02Mar06	416d		3.3.5.1				
3.3.5.2	Install Duct Bank B-4	\$44,117	\$0	\$44,117	02Mar06	15Mar06	416d		3.3.5.2				
3.3.5.3	Install Duct Bank C-0	\$66,604	\$0	\$66,604	16Mar06	29Mar06	416d		3.3.5.3				
3.3.5.4	Install Duct Bank C-1	\$35,439	\$0	\$35,439	30Mar06	12Apr06	420d		3.3.5.4				
3.3.5.5	Install Transformer Pad B-4	\$11,458	\$0	\$11,458	16Mar06	22Mar06	421d		3.3.5.5				
3.3.5.6	Install Transformer Pad C-0	\$31,512	\$0	\$31,512	30Mar06	18Apr06	416d		3.3.5.6				
3.3.5.7	Install Transformer Pad C-1	\$11,458	\$0	\$11,458	19Apr06	25Apr06	416d		3.3.5.7				
3.3.5.8	Install Transformer B-4	\$6,960	\$0	\$6,960	26Apr06	01May06	429d		3.3.5.8				
3.3.5.9	Install Transformer C-0	\$13,920	\$0	\$13,920	18May06	23May06	417d		3.3.5.9				
3.3.5.10	Install Transformer C-1	\$6,960	\$0	\$6,960	25May06	31May06	416d		3.3.5.10				
3.3.5.11	Install Panel boards	\$13,224	\$0	\$13,224	16Mar06	12Apr06	450d		3.3.5.11				
3.3.5.12	Pull 13.8 KV Primary, splice and wrap B-4	\$0	\$0	\$0	27Jul06	04Aug06	356d		3.3.5.12				
3.3.5.13	Pull 13.8 KV Primary, splice and wrap C-0	\$0	\$0	\$0	07Aug06	15Aug06	356d		3.3.5.13				
3.3.5.14	Pull 13.8 KV Primary, splice and wrap C-1	\$0	\$0	\$0	16Aug06	24Aug06	356d		3.3.5.14				
3.3.5.15	Pull and terminate secondary	\$0	\$0	\$0	25Aug06	31Aug06	356d		3.3.5.15				
3.3.5.16	Clean Transformers	\$0	\$0	\$0	01Sep06	06Sep06	356d		3.3.5.16				
3.3.5.17	Testing	\$0	\$0	\$0	07Sep06	11Sep06	356d		3.3.5.17				
3.3.5.18	Punch List	\$0	\$0	\$0	12Sep06	25Sep06	356d		3.3.5.18				
3.3.5.19	C Sector H V Ready By	\$0	\$0	\$0	26Sep06	26Sep06	356d		3.3.5.19				
4	Pre Procured Items	\$625,337	\$38,347	\$663,684	01Apr05	15May06	102d	4					
4.1	Procure Item EDIA FESS	\$0	\$38,347	\$38,347	01Apr05	29Apr05	137d	4.1					
4.2	Write procured item specs	\$0	\$0	\$0	02May05	13Jun05	137d	4.2					
4.3	SC: Delay RFP's	\$0	\$0	\$0	14Jun05	14Jun05	152d	4.3					
4.4	Bid and award cable	\$0	\$0	\$0	14Jun05	11Aug05	152d	4.4					
4.5	Phase 1 Cable Procure and delivery	\$16,441	\$0	\$16,441	03Oct05	24Jan06	117d	4.5					
4.6	C Sector Cable procure and delivery	\$246,617	\$0	\$246,617	30Nov05	15May06	356d	4.6					
4.7	Bid and award transformers	\$0	\$0	\$0	14Jun05	11Aug05	137d	4.7					
4.8	Phase 1 Transformer Procure and Deliver	\$61,480	\$0	\$61,480	03Oct05	14Feb06	102d	4.8					
4.9	C SectorTrans. procure and delivery	\$242,440	\$0	\$242,440	30Nov05	25Apr06	429d	4.9					
4.10	Bid and award Air switch	\$0	\$0	\$0	14Jun05	11Aug05	156d	4.10					
4.11	Phase 1 4-Bay Switch Procure and Delivery	\$29,179	\$0	\$29,179	03Oct05	17Jan06	121d	4.11					
4.12	C Sector 4-Bay Switch procure and delivery	\$29,178	\$0	\$29,178	30Nov05	14Mar06	459d	4.12					
5	CDR, ACDR, & Project Reviews	\$80,904	\$260,846	\$341,751	01Oct03	10Mar05	0						

BTeV - WBS 3.0 C0 Building Outfitting

Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year

Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead

Non-Fermilab Labor: Salary, Benefits & Overhead

Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates -

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05	FY06	FY07	FY08	FY09	
5.3	FY05 Fess Engineering	\$0	\$57,984	\$57,984	01Oct04	10Mar05	15d						
5.4	FY05 Consultant Engineer	\$0	\$0	\$0	01Oct04	10Mar05	15d						
6	Milestones	\$0	\$0	\$0	01Oct03	30Jun11	0						
6.1	Inter-Subproject link Milestones	\$0	\$0	\$0	01Oct03	30Sep10	0						
6.1.2	Construction Phase Milestones	\$0	\$0	\$0	01Oct04	30Sep10	0						
6.1.2.1	Lk3M: Start FY05	\$0	\$0	\$0	01Oct04	01Oct04	0						
6.1.2.2	Lk3M: Start FY05 Shutdown	\$0	\$0	\$0	08Aug05	08Aug05	0						
6.1.2.3	Lk3M: End FY05 Shutdown	\$0	\$0	\$0	30Sep05	30Sep05	0						
6.1.2.4	Lk3M: End Y05	\$0	\$0	\$0	30Sep05	30Sep05	0						
6.1.2.5	Lk3M: Start FY06	\$0	\$0	\$0	01Oct05	01Oct05	0						
6.1.2.6	Lk3M: Start FY06 Shutdown	\$0	\$0	\$0	07Aug06	07Aug06	0						
6.1.2.7	Lk3M: End FY06 Shutdown	\$0	\$0	\$0	29Sep06	29Sep06	0						
6.1.2.8	Lk3M: End FY06	\$0	\$0	\$0	29Sep06	29Sep06	0						
6.1.2.9	Lk3M: Start FY07	\$0	\$0	\$0	01Oct06	01Oct06	0						
6.1.2.10	Lk3M: Start FY07 Shutdown	\$0	\$0	\$0	06Aug07	06Aug07	0						
6.1.2.11	Lk3M: End FY07 Shutdown	\$0	\$0	\$0	28Sep07	28Sep07	0						
6.1.2.12	Lk3M: End FY07	\$0	\$0	\$0	30Sep07	30Sep07	0						
6.1.2.13	Lk3M: Start FY08	\$0	\$0	\$0	01Oct08	01Oct08	0						
6.1.2.14	Lk3M: Start FY08 Shutdown	\$0	\$0	\$0	04Aug08	04Aug08	0						
6.1.2.15	Lk3M: End FY08 Shutdown	\$0	\$0	\$0	26Sep08	26Sep08	0						
6.1.2.16	Lk3M: End FY08	\$0	\$0	\$0	30Sep08	30Sep08	0						
6.1.2.17	Lk3M: Start FY09	\$0	\$0	\$0	01Oct08	01Oct08	0						
6.1.2.18	Lk3M: Start FY09 Shutdown	\$0	\$0	\$0	03Aug09	03Aug09	0						
6.1.2.19	Lk3M: End FY09 Shutdown	\$0	\$0	\$0	30Nov09	30Nov09	0						
6.1.2.20	Lk3M: End FY09	\$0	\$0	\$0	30Sep09	30Sep09	0						
6.1.2.21	Lk3M: Start FY10	\$0	\$0	\$0	01Oct09	01Oct09	0						
6.1.2.22	Lk3M: Start Final Installation Shutdown	\$0	\$0	\$0	02Jul10	02Jul10	0						
6.1.2.23	Lk3M: End Final Installation Shutdown	\$0	\$0	\$0	30Sep10	30Sep10	0						
6.1.2.24	Lk3M: End Construction Phase	\$0	\$0	\$0	30Sep10	30Sep10	0						
6.1.2.25	Lk3M: End FY10	\$0	\$0	\$0	30Sep10	30Sep10	0						
6.2	DOE, Fermilab and BTeV Management Milestones	\$0	\$0	\$0	17Feb04	30Jun11	0						
6.2.1	Tier 0 DOE Headquarters CD Milestones	\$0	\$0	\$0	17Feb04	30Jun11	0						
6.2.1.2	T0M: CD-1 Approve Preliminary Baseline Range	\$0	\$0	\$0	30Dec04	30Dec04	0						
6.2.1.3	T0M: CD-2 Approve Performance Baseline	\$0	\$0	\$0	31Mar05	31Mar05	0						
6.2.1.4	T0M: CD-3a Approve Limited Construction	\$0	\$0	\$0	31Mar05	31Mar05	0						

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

Milestone

Progress

Summary

Float

Activity ID	Activity Description	Materials & Services Costs	Labor Costs	Total Cost	Early Start	Early Finish	Float	FY05				FY06				FY07				FY08				FY09				
6.2.1.5	T0M: CD-3b Approve Start of Construction	\$0	\$0	\$0	30Sep05	30Sep05	0					6.2.1.5																
6.2.1.6	T0M: CD-4 Approve Start of Ops - Project Closeout	\$0	\$0	\$0	30Jun11	30Jun11	0																					
6.2.2	Tier 1DOE Headquarters Milestones	\$0	\$0	\$0	28Jul06	28Jul06	0						6.2.2															
6.2.2.1	T1M-2: Occupancy: C0 low lvl, upper staging area	\$0	\$0	\$0	28Jul06	28Jul06	0						6.2.2.1															
6.2.3	Tier 2 DOE Chicago Milestones	\$0	\$0	\$0	02Jun05	01May08	0			6.2.3																		
6.2.3.1	T2M-23: Start C0 Outfitting construction	\$0	\$0	\$0	02Jun05	02Jun05	0			6.2.3.1																		
6.2.3.2	T2M-24: Occupancy: C0 low lvl, upper staging area	\$0	\$0	\$0	28Jul06	28Jul06	0						6.2.3.2															
6.2.3.3	T2M-25: C0 Outfitting construction complete	\$0	\$0	\$0	01May08	01May08	0																6.2.3.3					
6.2.4	Tier 3 Fermilab Directorate, BTeV Mgmt. Milestones	\$0	\$0	\$0	01Jun05	01May08	0			6.2.4																		
6.2.4.1	T3M-84: Start C0 Outfitting construction	\$0	\$0	\$0	01Jun05	01Jun05	0			6.2.4.1																		
6.2.4.2	T3M-85: Occupancy: C0 low lvl, upper staging area	\$0	\$0	\$0	28Jul06	28Jul06	0						6.2.4.2															
6.2.4.3	T3M-86: Collision Hall completed	\$0	\$0	\$0	31Jan08	31Jan08	0																6.2.4.3					
6.2.4.4	T3M-87: Assy, Service Bldg construction completed	\$0	\$0	\$0	01May08	01May08	0																6.2.4.4					
7	EarlyTarget Ready By Dates	\$0	\$0	\$0	04Jan05	11Sep07	64d			7																		
7.1	T5M: MS-1 Start Engineering	\$0	\$0	\$0	04Jan05	04Jan05	130d			7.1																		
7.2	T4M: MS-2 Start Construction	\$0	\$0	\$0	06Apr05	06Apr05	65d				7.2																	
7.3	T5M: MS-3 Side Bay. Struct. Complete	\$0	\$0	\$0	08Sep05	08Sep05	90d					7.3																
7.4	T5M: MS-4 Temo Power Operational (Fdr 45)	\$0	\$0	\$0	26Apr06	26Apr06	64d						7.4															
7.5	T4M: MS-5 Beneficial occupancy of lower level and upper staging area	\$0	\$0	\$0	22Mar06	22Mar06	90d						7.5															
7.6	T5M: MS-6 Collision Hall Complete	\$0	\$0	\$0	26Mar07	26Mar07	131d																7.6					
7.7	T5M: MS-7 Mechancal Systems Complete (Except CH)	\$0	\$0	\$0	29May07	29May07	187d																7.7					
7.8	T5M: MS-8 Electrical Systems Complete	\$0	\$0	\$0	06Jul07	06Jul07	160d																7.8					
7.9	T4M: MS-9 Assembly, Service Building Construction Complete	\$0	\$0	\$0	06Jul07	06Jul07	160d																7.9					
7.10	T5M: MS-10 Engineering Complete	\$0	\$0	\$0	11Sep07	11Sep07	160d																7.10					

BTeV - WBS 3.0 C0 Building Outfitting
Total Construction Obligation Profile (FY05\$K) by Institution & Fiscal Year
Fermilab Labor: Salary, OPTO, Vacation, Fringe & Overhead
Non-Fermilab Labor: Salary, Benefits & Overhead
Contingency Not Included, Material Burdened

30Nov04

Planned

Critical

Late Dates

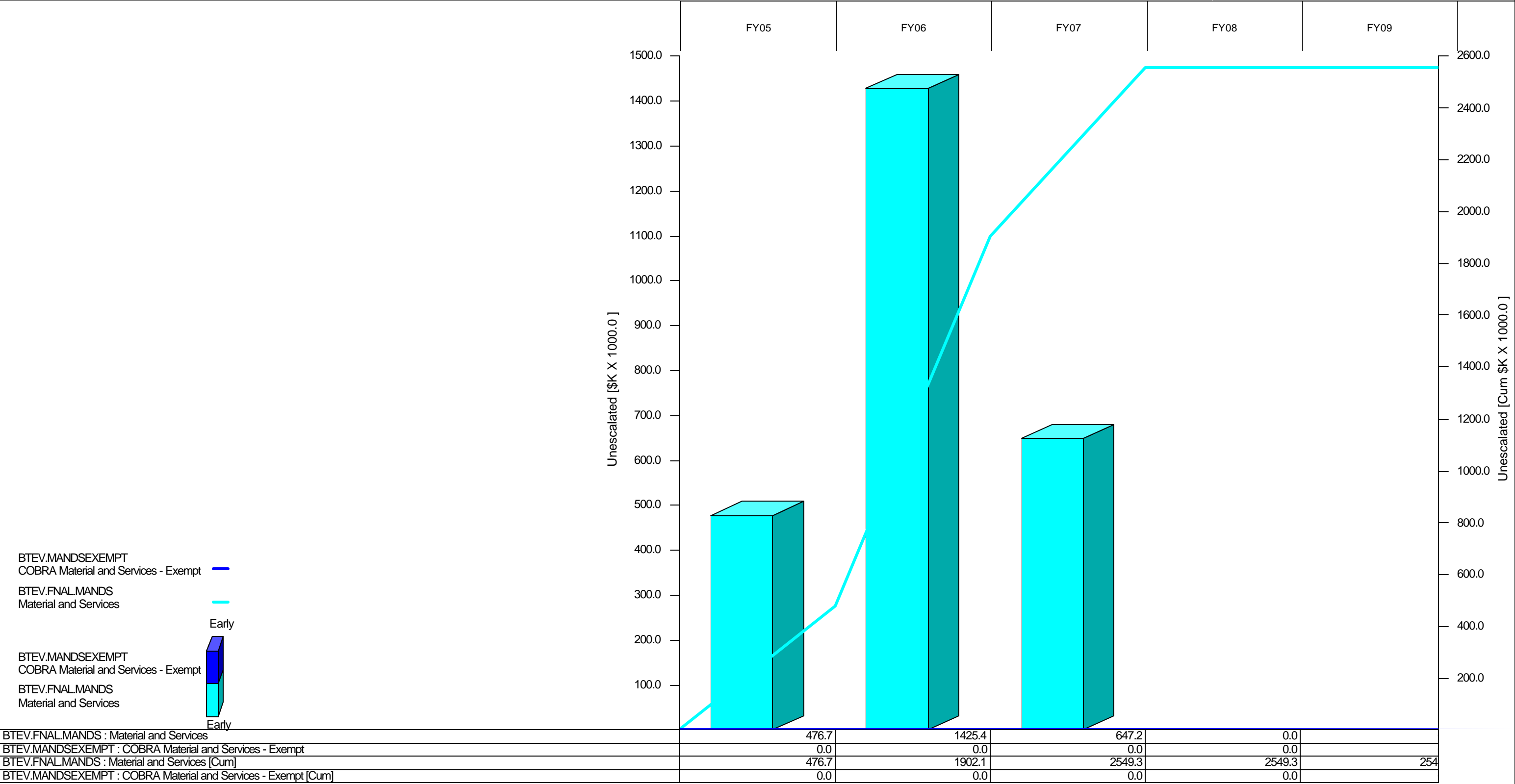
Milestone

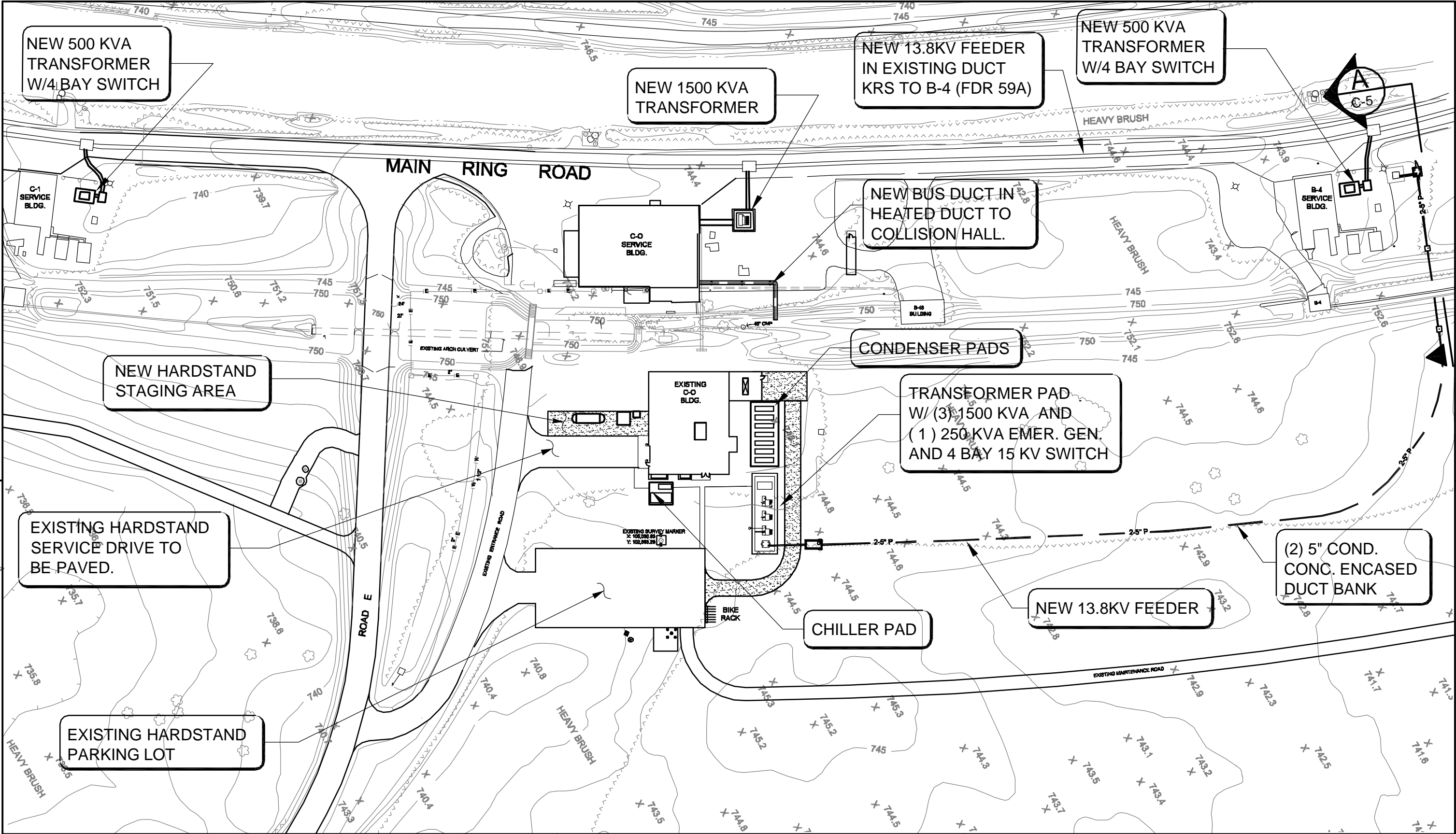
Progress

Summary

Float

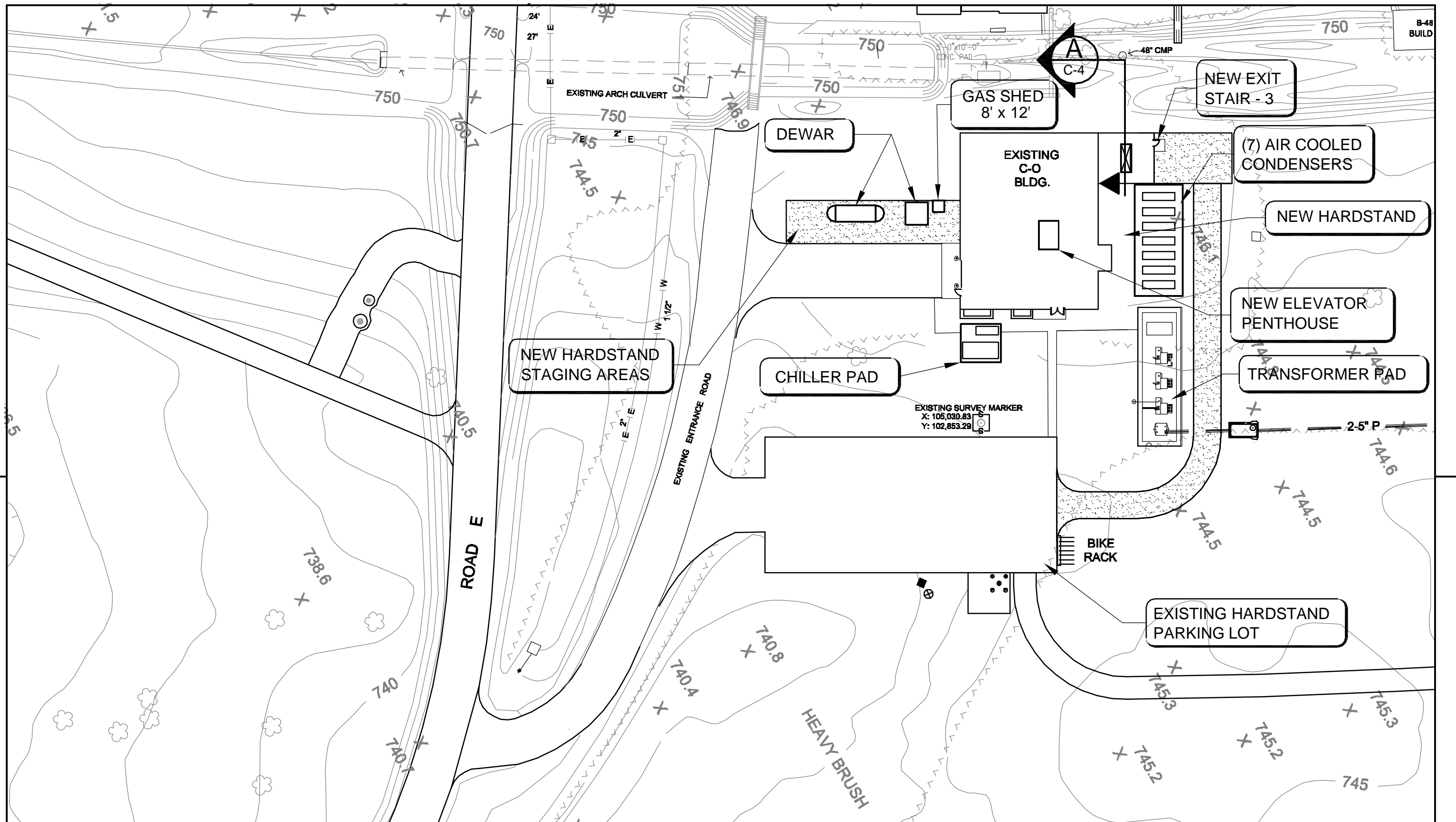
-



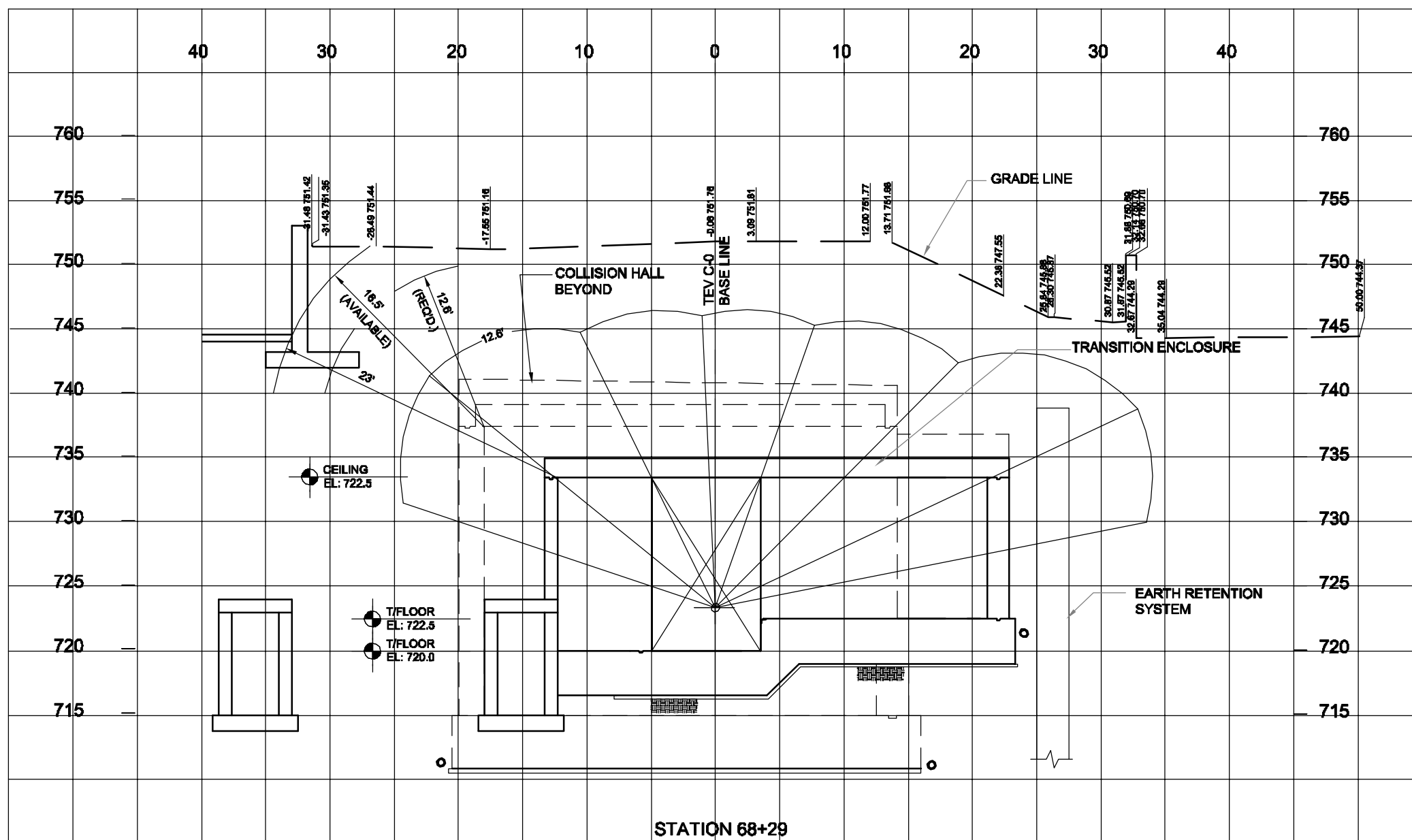


			NAME		DATE	<div>SCALE: 1" = 70'-0"</div> <div><div>70000140</div><div>SCALE</div><div>FEET</div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></</div></div></div></div>
--	--	--	------	--	------	---

Dwg: C1-C2-C3-e-8-B-TeV.dwg Plotted: 17OCT03 @ 06:54:15a.m.



--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



SECTION

SCALE: 1"=10'-0

A
C-3

[illegible]

SCALE:
" = 10'-0"

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

C-0 OUTFITTING

CIVIL SECTION SHEET - 1

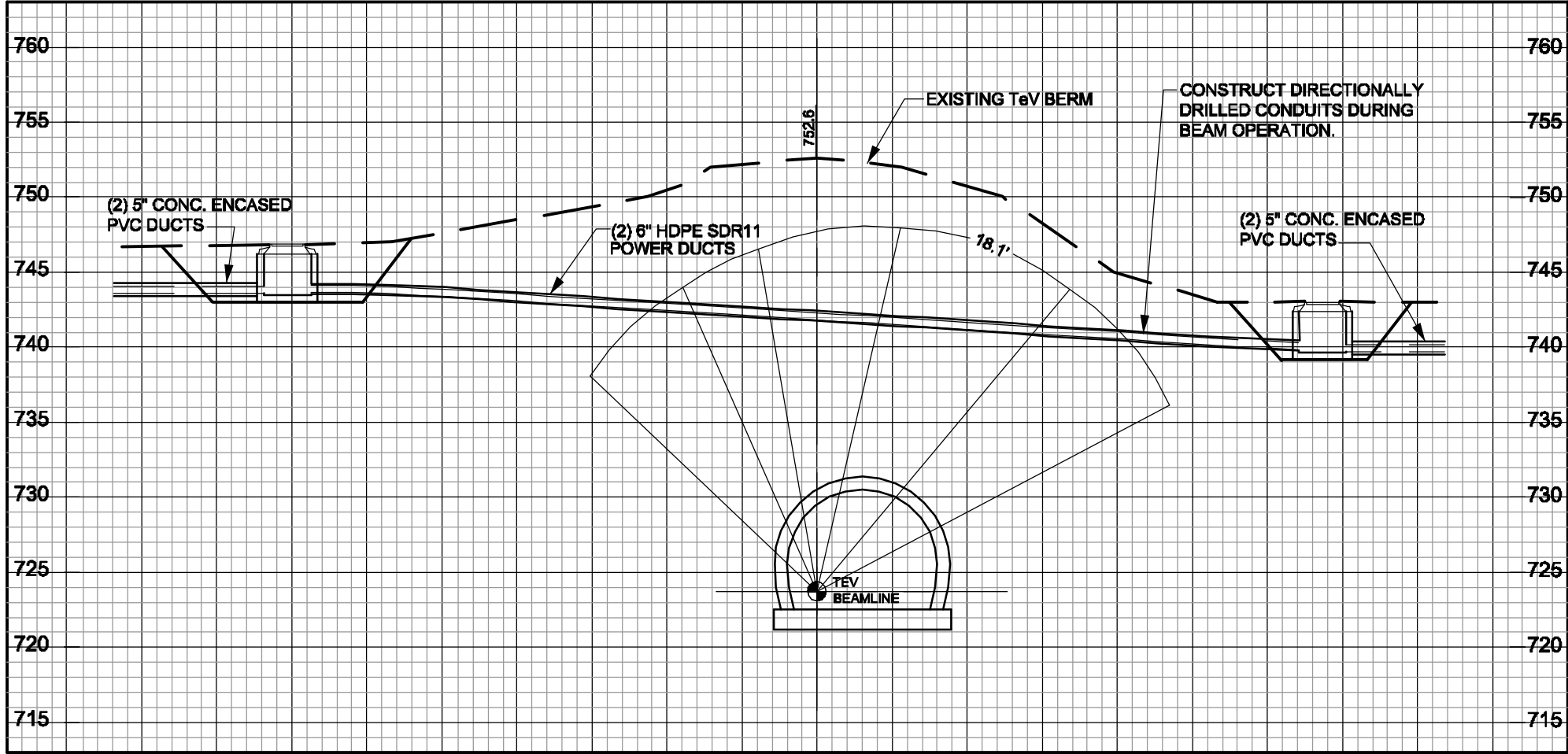
DRAWING NO. **6-8-3**

TITLE - 1

C-4

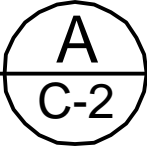
REV.

OCTOBER 2004



SECTION

SCALE: 1"=10'-0"



Dwg: C-2.dwg Plotted: 08OCT03 @ 11:55:28a.m.

			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE:

1" = 10'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-0 OUTFITTING
CIVIL SECTION SHEET - 2

DRAWING NO.

6-8-3

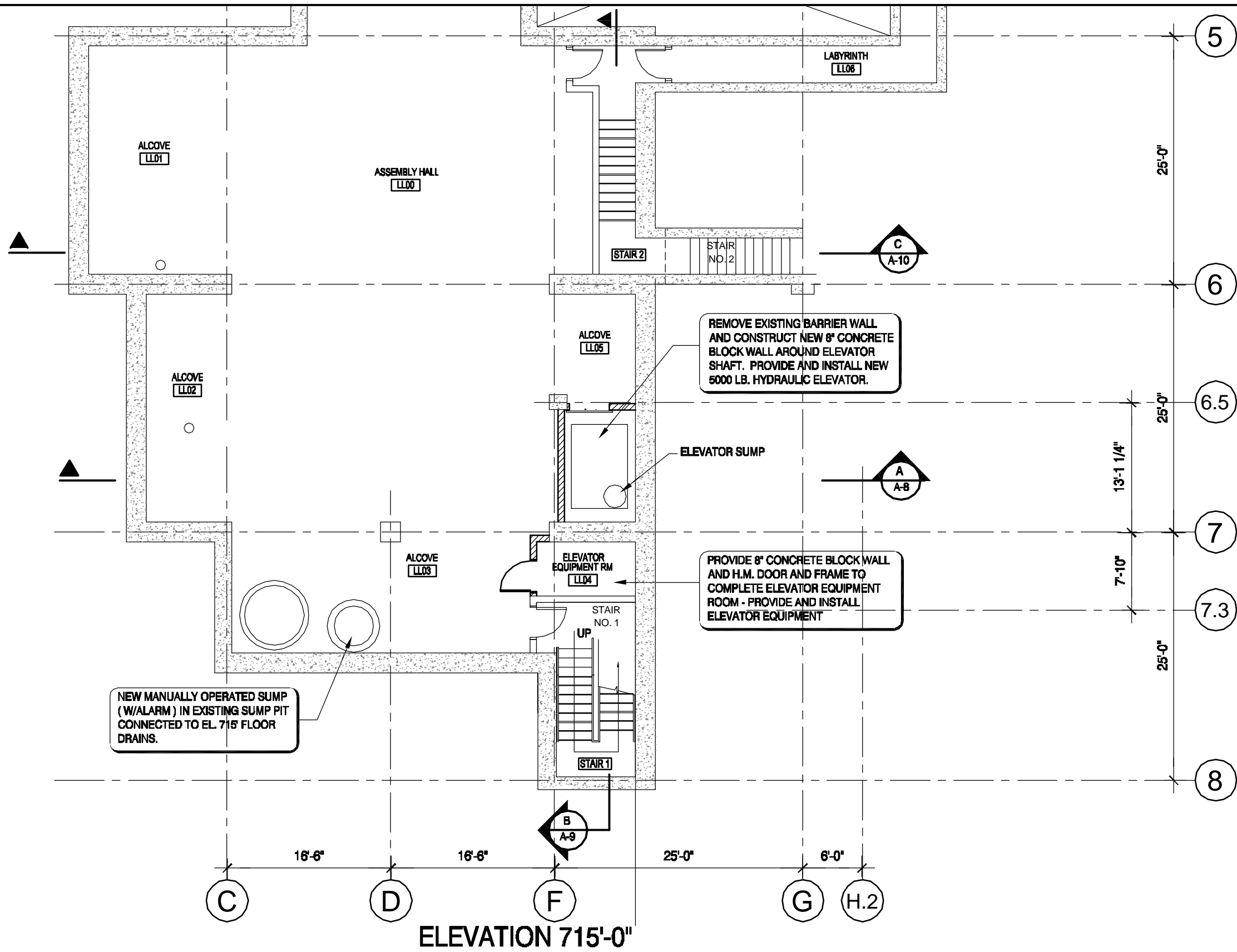
TITLE - 1

C-5

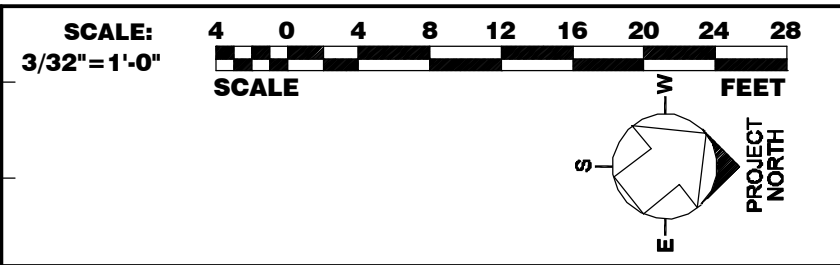
REV.

OCTOBER 2004

Dwg: 6-8-B-Tev-CDR.dwg Plotted: 16SEP04 @ 02:49:26p.m.

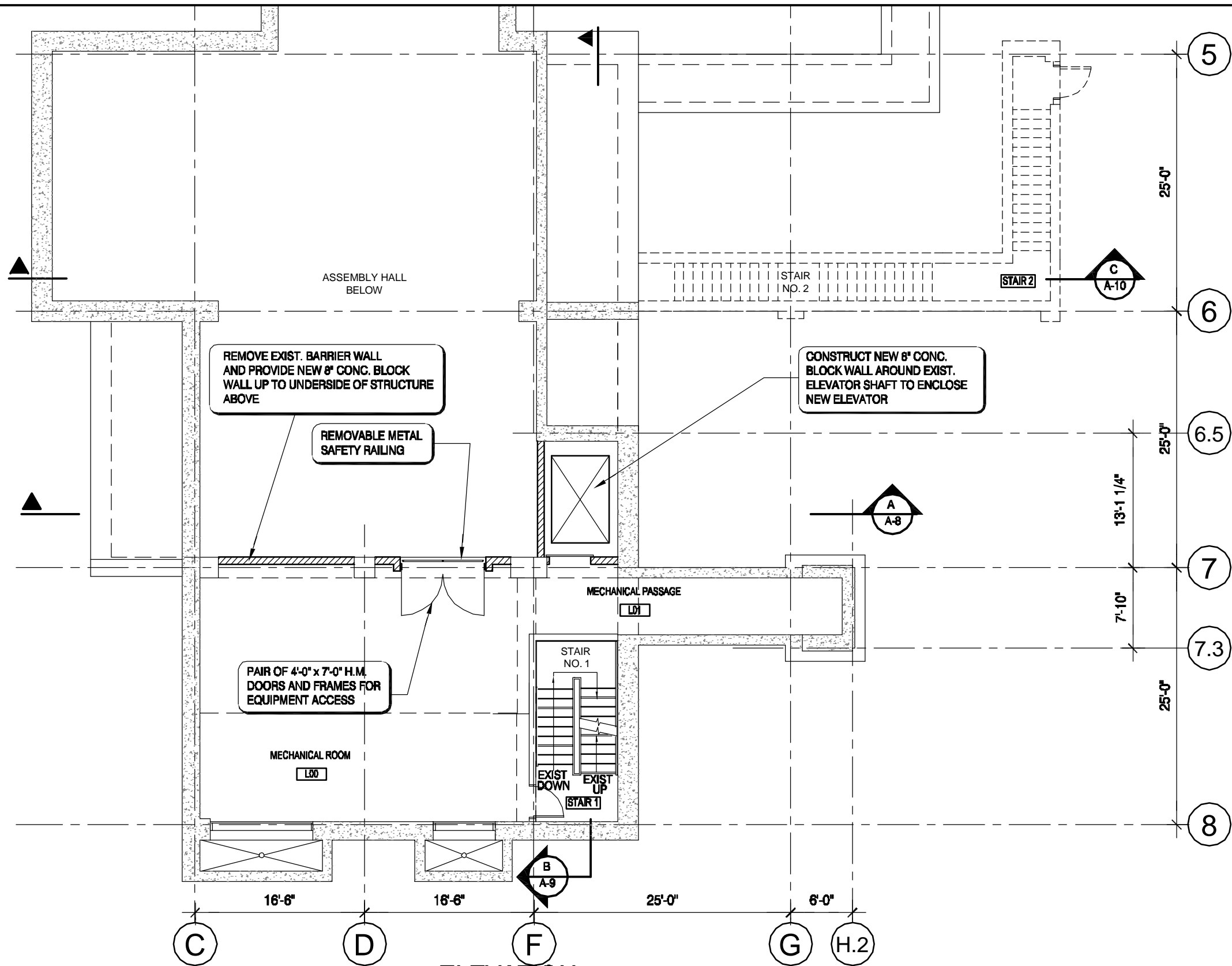


			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					



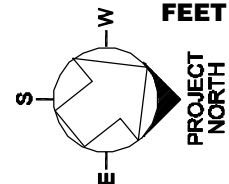
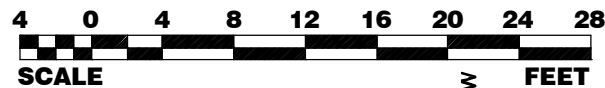
FERMI NATIONAL ACCELERATOR LABORATORY			
UNITED STATES DEPARTMENT OF ENERGY			
C-O OUTFITTING			
PLAN AT 715'-0"			
DRAWING NO.	6-8-3	TITLE - 1	A-1
			REV.

OCTOBER 2004



ELEVATION 731'-4"

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING

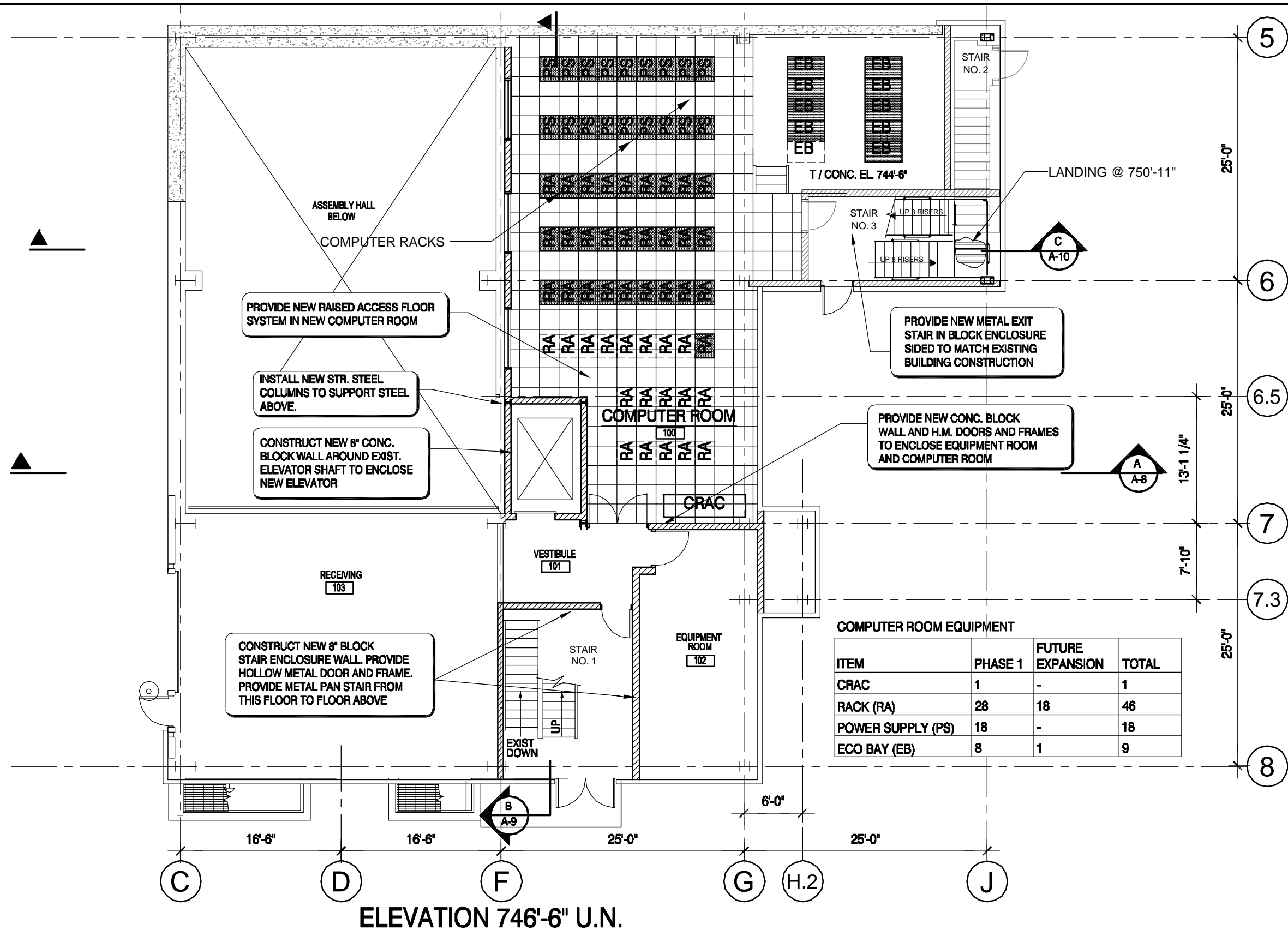
PLAN AT 731'-4"

DRAWING NO. 6-8-3

TITLE - 1

A-2

REV.

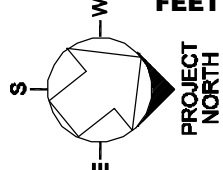
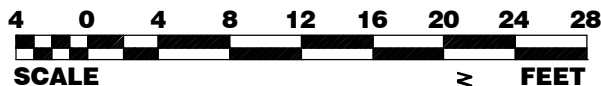


ELEVATION 746'-6" U.N.

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

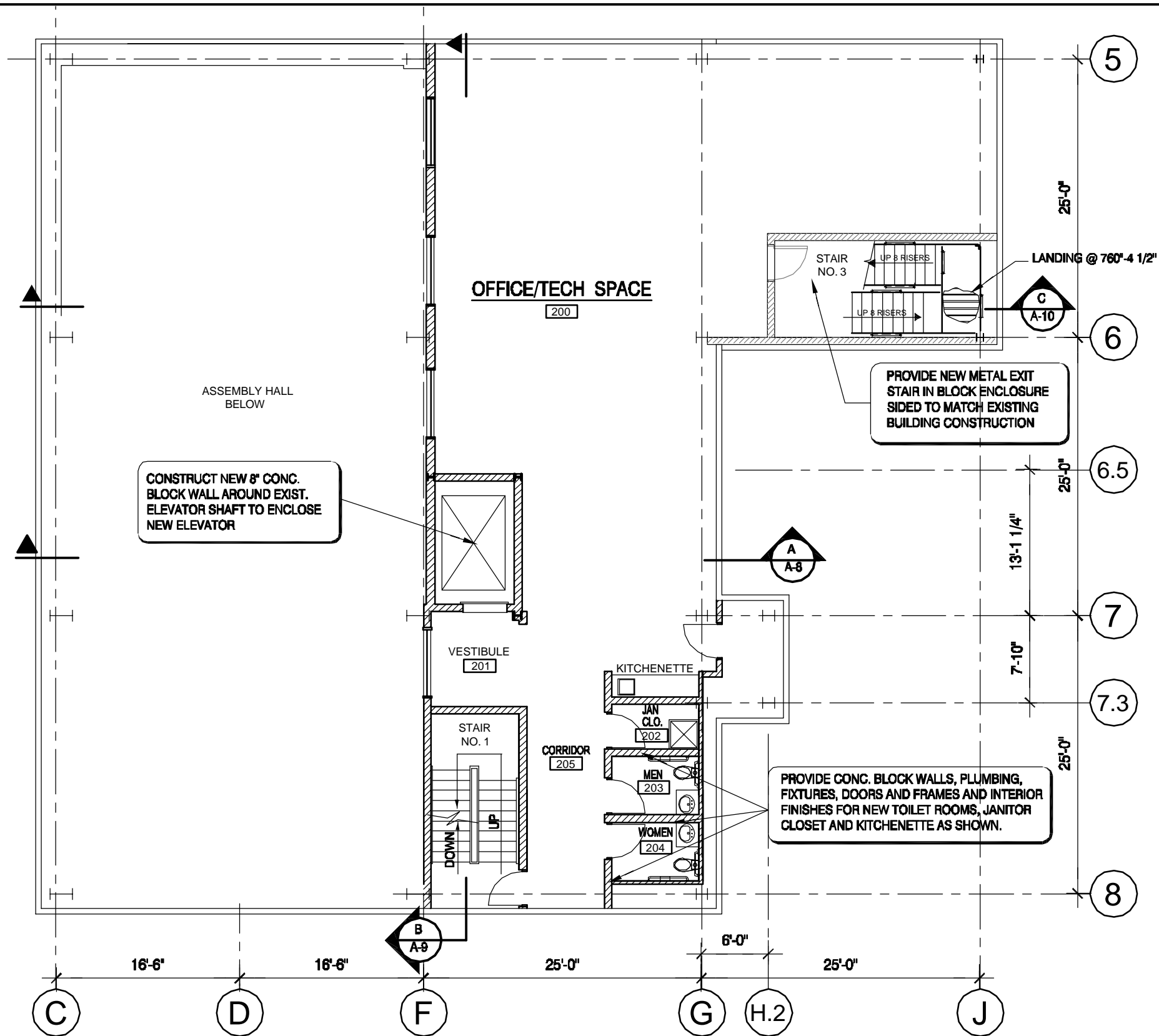
C-O OUTFITTING
PLAN AT 746'-6"

DRAWING NO. **6-8-3**

TITLE - 1

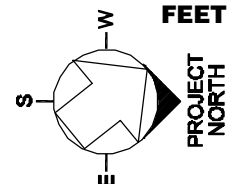
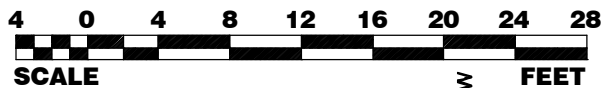
A-3REV.

OCTOBER 2004



T/CONC. ELEVATION 755'-4"

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING

PLAN AT 755'-4"

DRAWING NO. 6-8-3

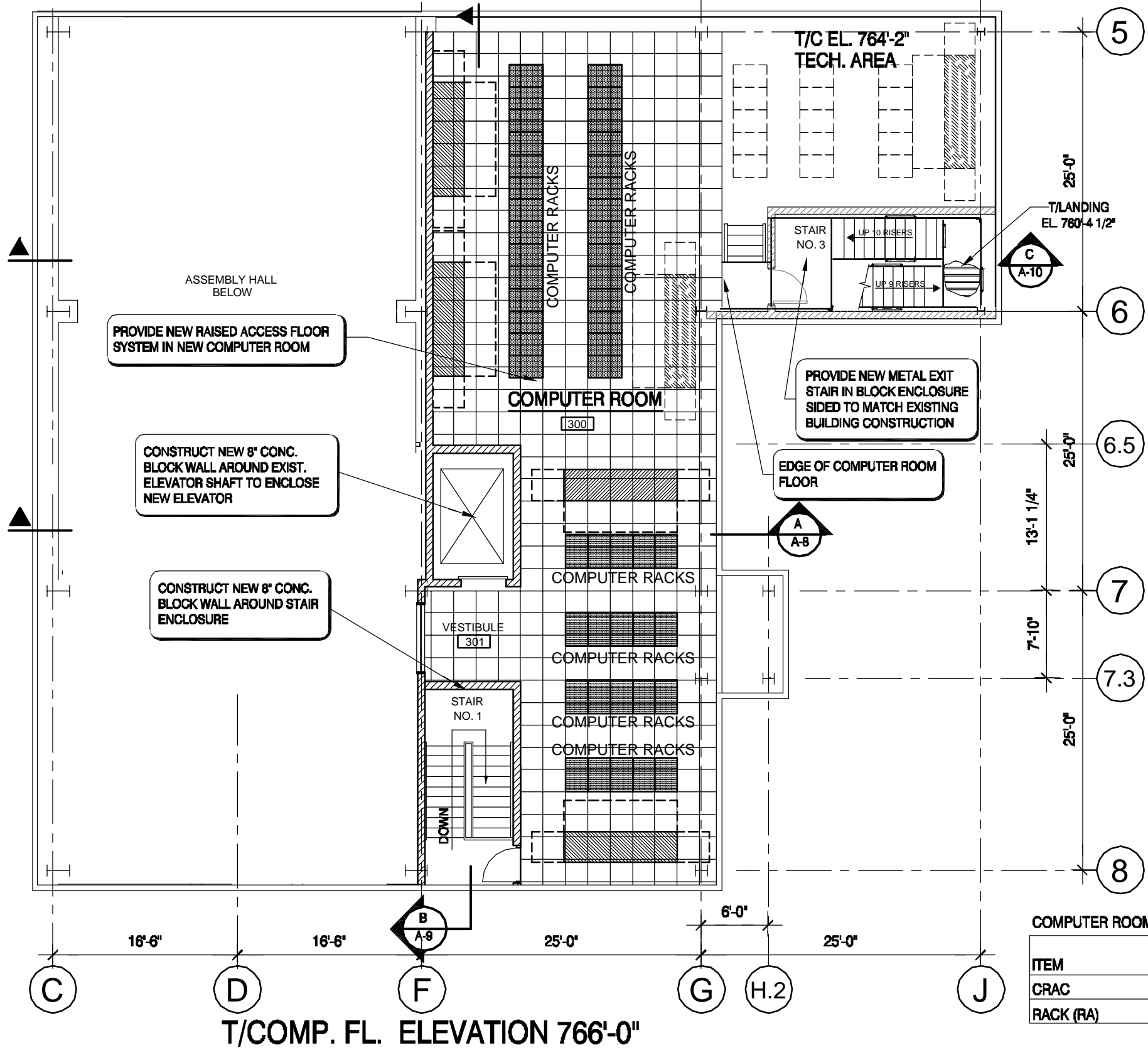
TITLE - 1

A-4

REV.

OCTOBER 2004

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.



COMPUTER ROOM EQUIPMENT

ITEM	PHASE 1	FUTURE EXPANSION	TOTAL
CRAC	4	2	6
RACK (RA)	48	15	63

		NAME	DATE
DESIGNED			
DRAWN			
CHECKED			
APPROVED			
SUBMITTED			
REV.	DATE	DESCRIPTIONS	
		REVISIONS	

SCALE: 3/32" = 1'-0"

4 0 4 8 12 16 20 24 28

SCALE FEET

PROJECT NORTH

FERMI NATIONAL ACCELERATOR LABORATORY

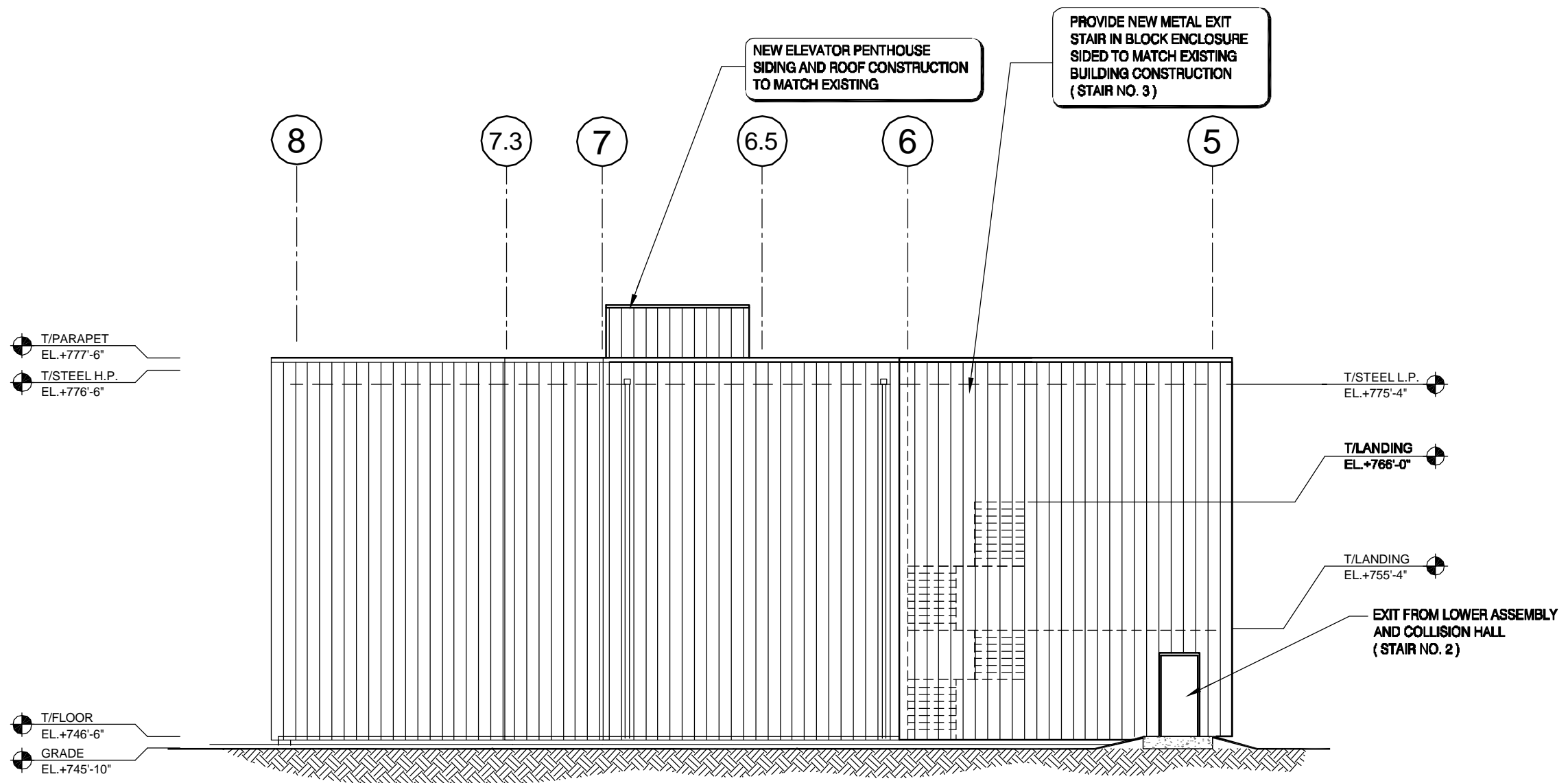
UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING

PLAN AT 766'-0"

DRAWING NO. **6-8-3** TITLE - 1 **A-5** REV.

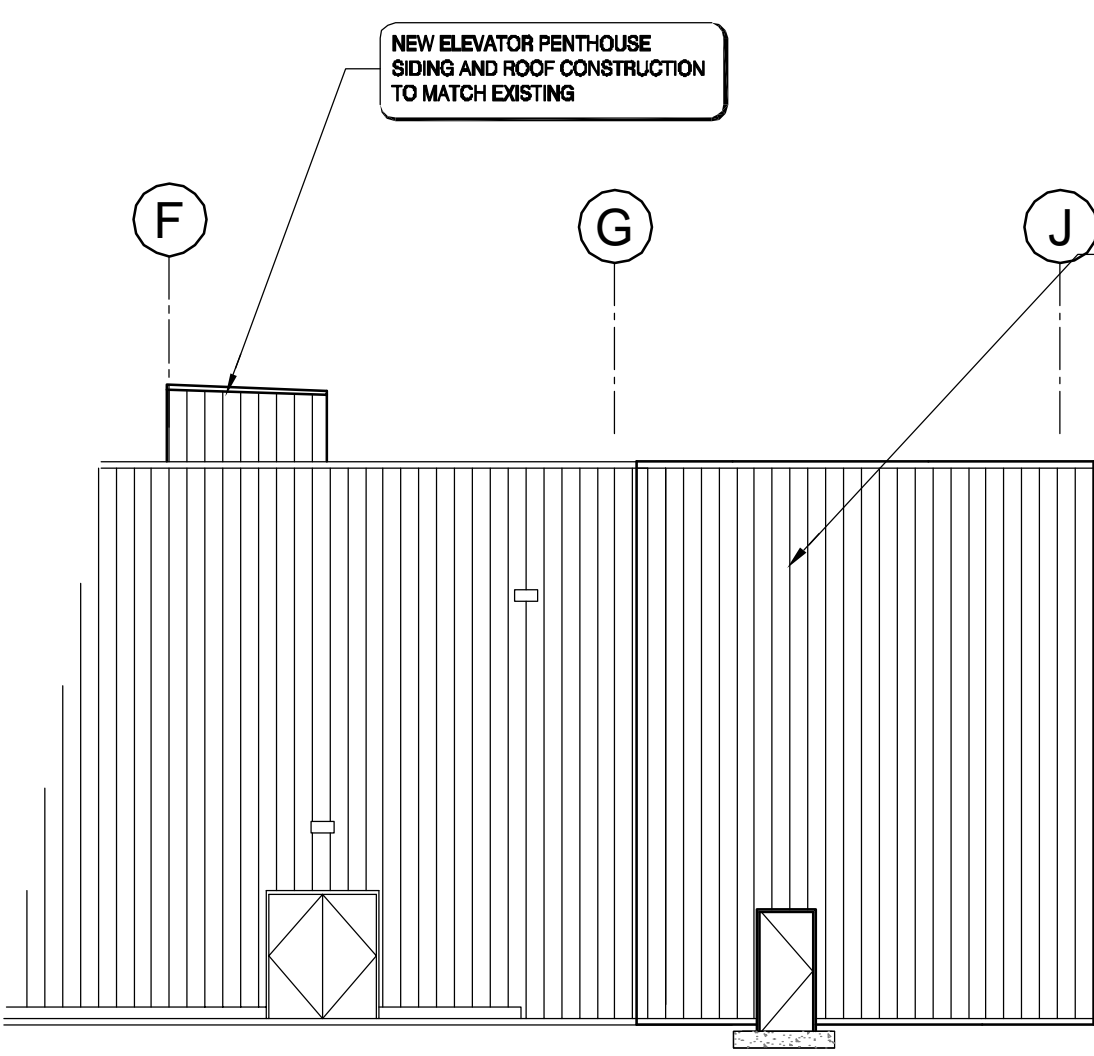
OCTOBER 2004



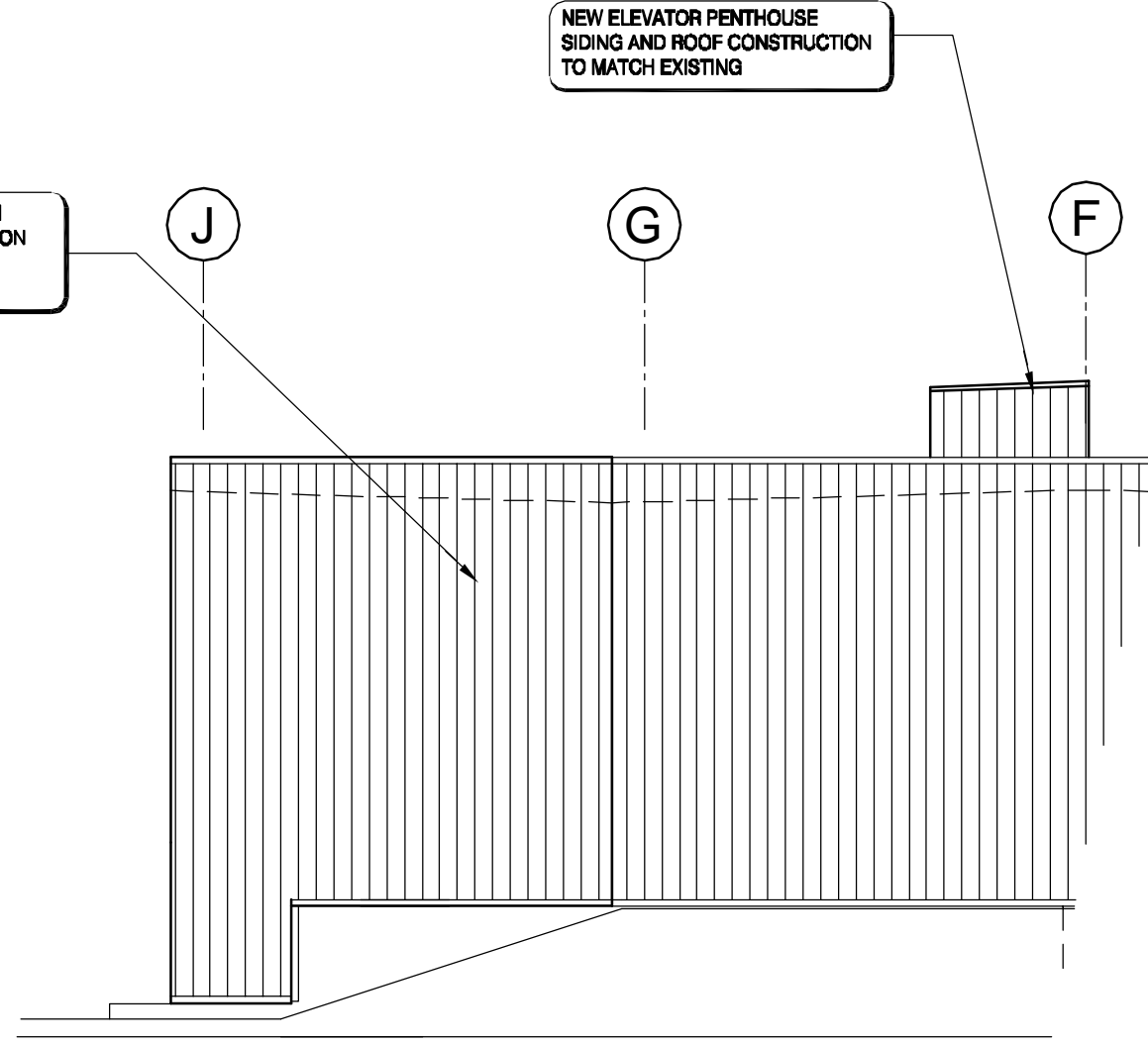
NORTH ELEVATION
LOOKING SOUTH

			NAME		DATE	SCALE: 3/32" = 1'-0"	 SCALE FEET	FERMI NATIONAL ACCELERATOR LABORATORY					
								UNITED STATES DEPARTMENT OF ENERGY					
			DESIGNED						C-O OUTFITTING NORTH ELEVATION				
			DRAWN										
			CHECKED										
			APPROVED										
			SUBMITTED										
REV.	DATE	DESCRIPTIONS							DRAWING NO. 6-8-3	TITLE - 1	A-6	REV.	OCTOBER 2004
		REVISIONS											

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.



EAST ELEVATION
LOOKING WEST




WEST ELEVATION
LOOKING EAST

			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE:
3/32" = 1'-0"

40481216202428

SCALEFEET



FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING
EAST AND WEST ELEVATIONS

DRAWING NO. **6-8-3**

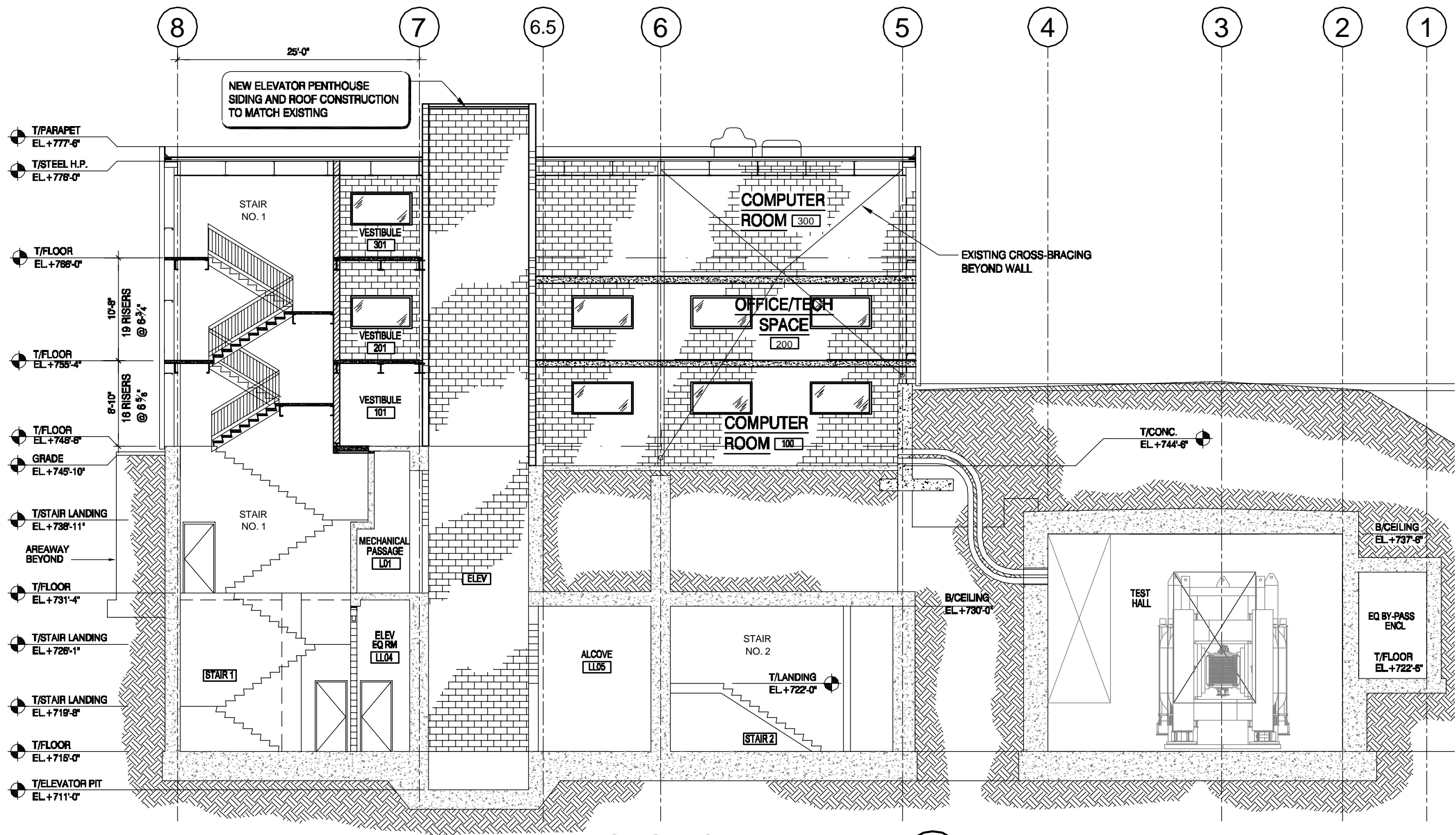
TITLE - 1

A-7

REV.

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

OCTOBER 2004

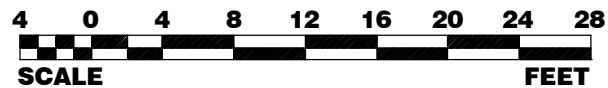


SECTION

SCALE 3/32"=1'-0"

B

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING
BUILDING SECTION SHT. - 2



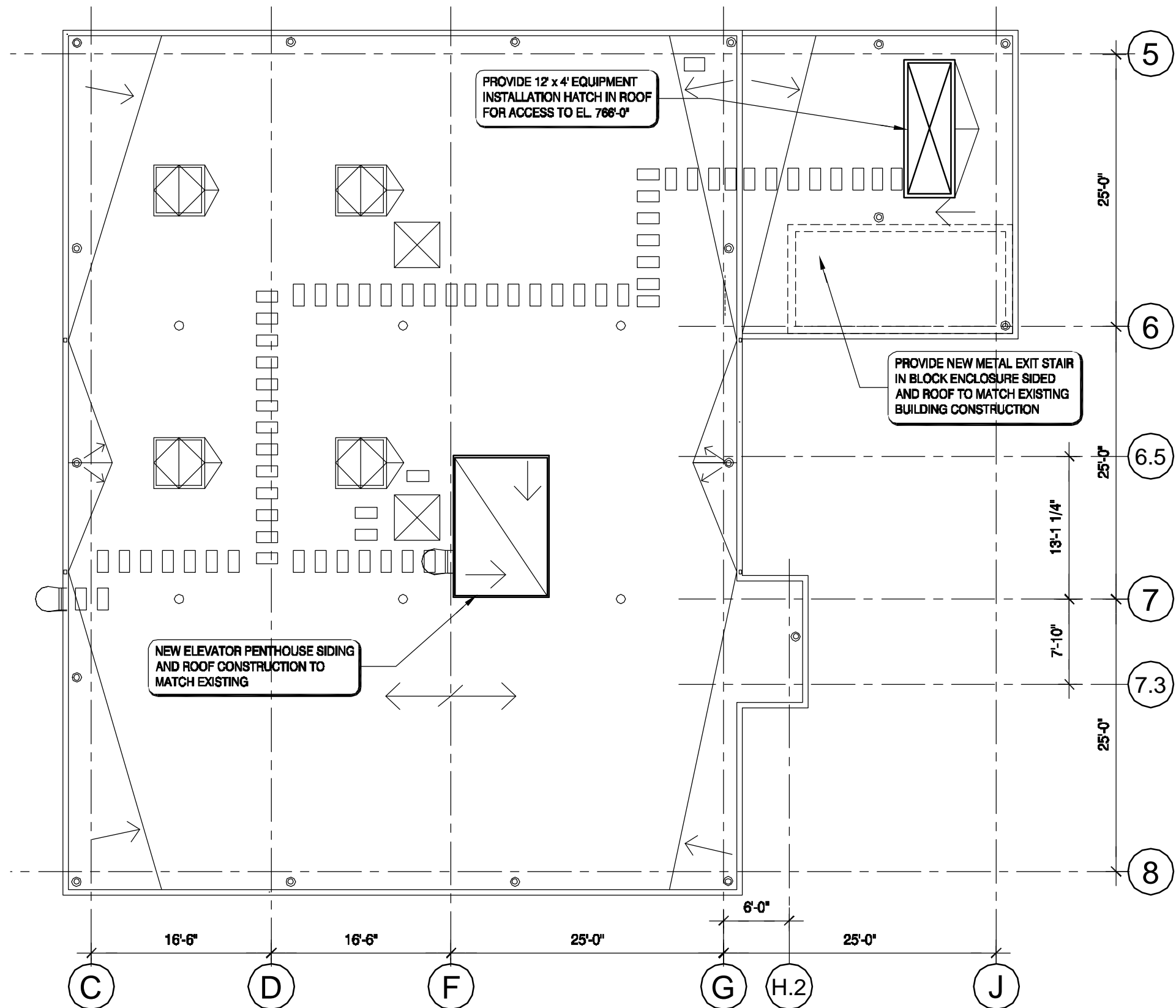
DRAWING NO. **6-8-3**

TITLE - 1

A-9

REV.

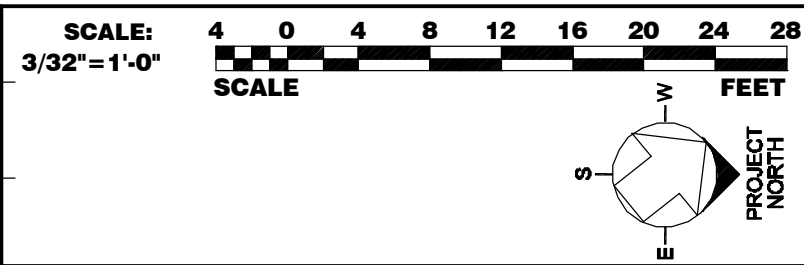
OCTOBER 2004



T/EX. ROOF PLAN ELEVATION 776'-5"

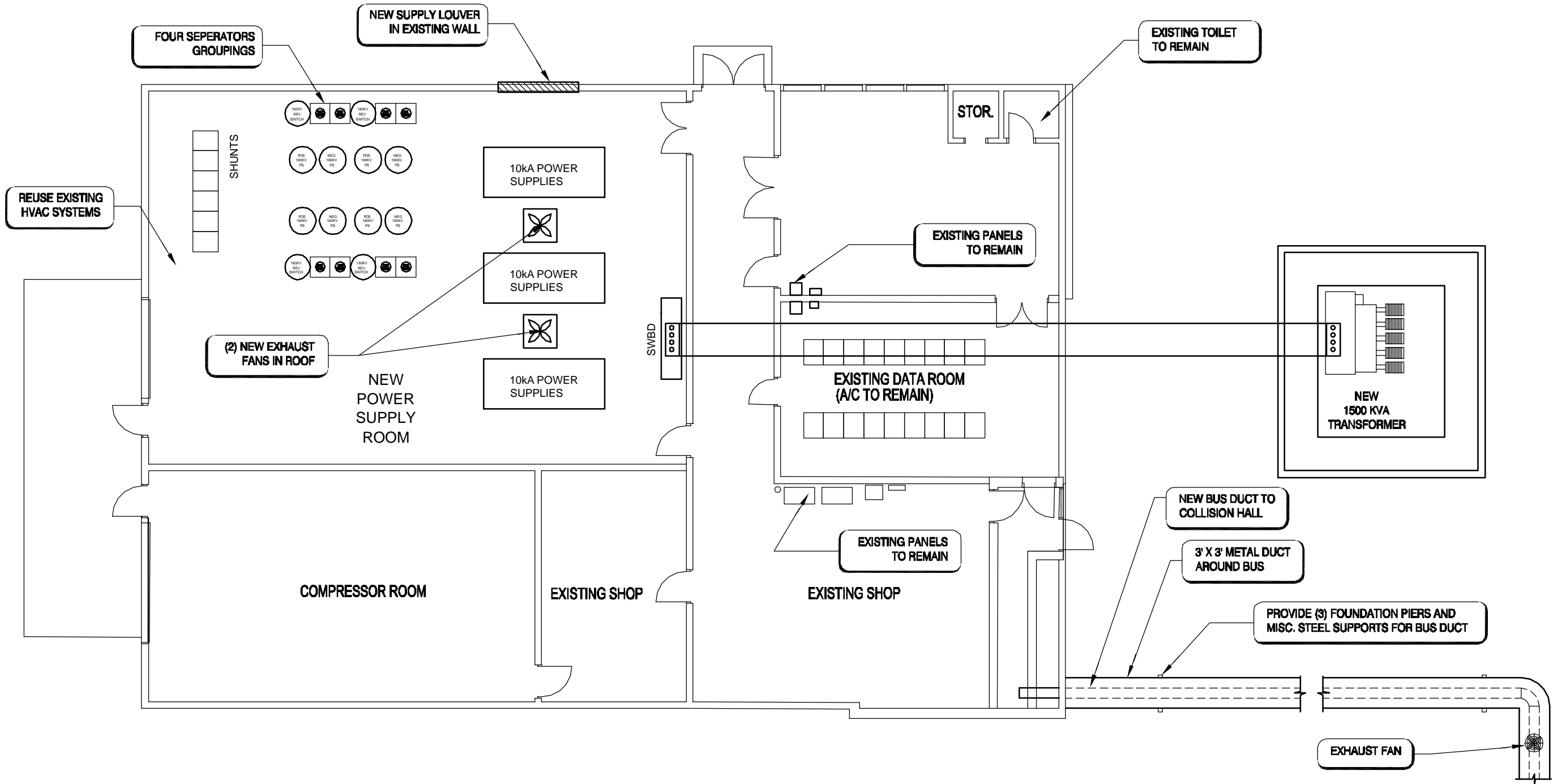
Dwg: 6-8-B-Tev-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

			NAME	DATE
DESIGNED				
DRAWN				
CHECKED				
APPROVED				
SUBMITTED				
REV.	DATE	DESCRIPTIONS		
REVISIONS				



FERMI NATIONAL ACCELERATOR LABORATORY			
UNITED STATES DEPARTMENT OF ENERGY			
	C-O OUTFITTING		
	ROOF PLAN		
DRAWING NO.	6-8-3	TITLE 1	A-11
			REV.

OCTOBER 2004

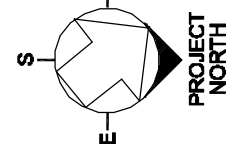
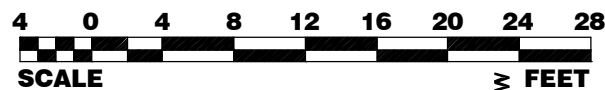


EXISTING C0 SERVICE BLDG. - T/FLOOR 744'-0"

Dwg: 6-8-B-Tev-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING
C-O SERVICE BLDG. PLAN @ EL. 744'-0"

DRAWING NO. **6-8-3**

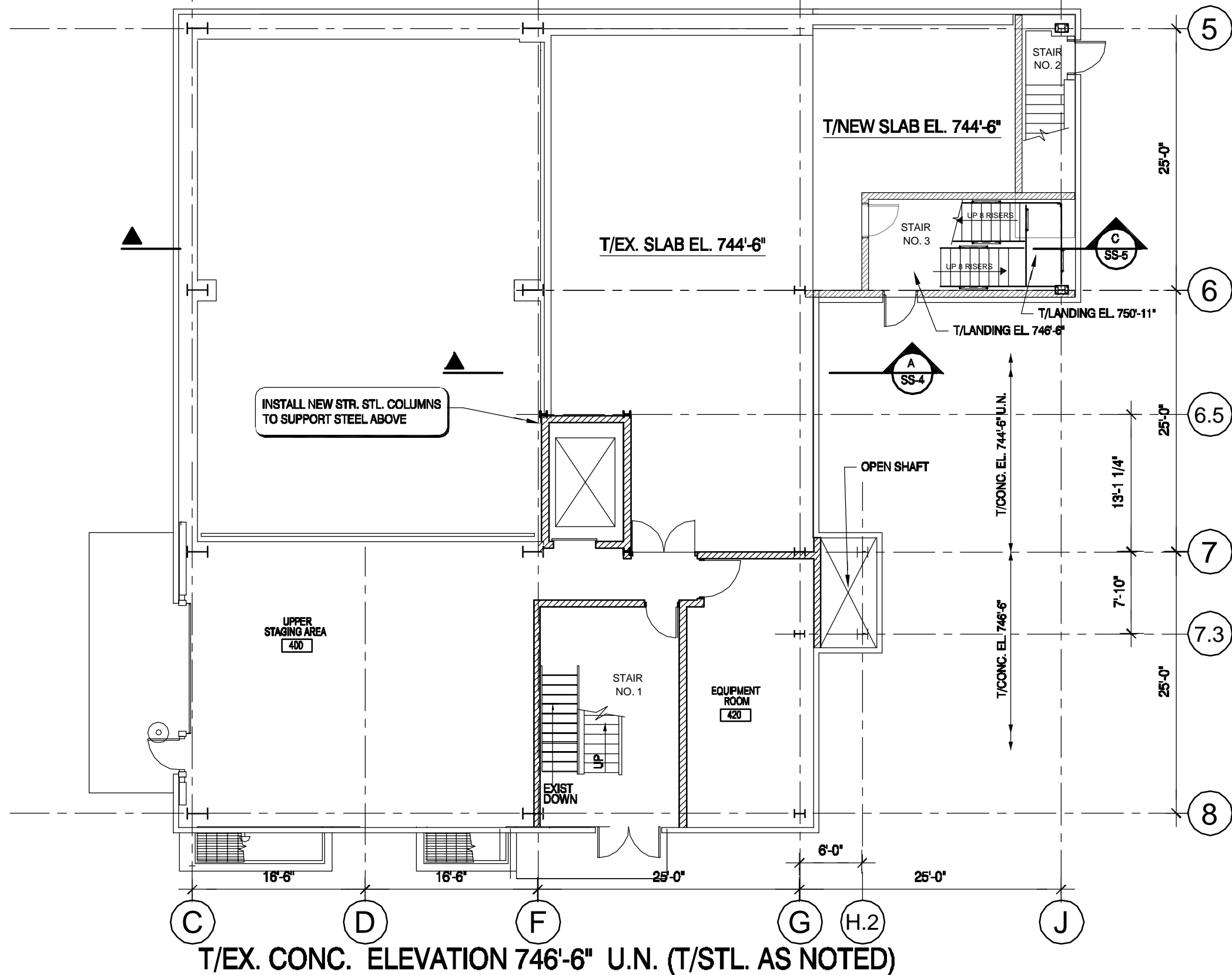
TITLE - 1

A-12

REV.

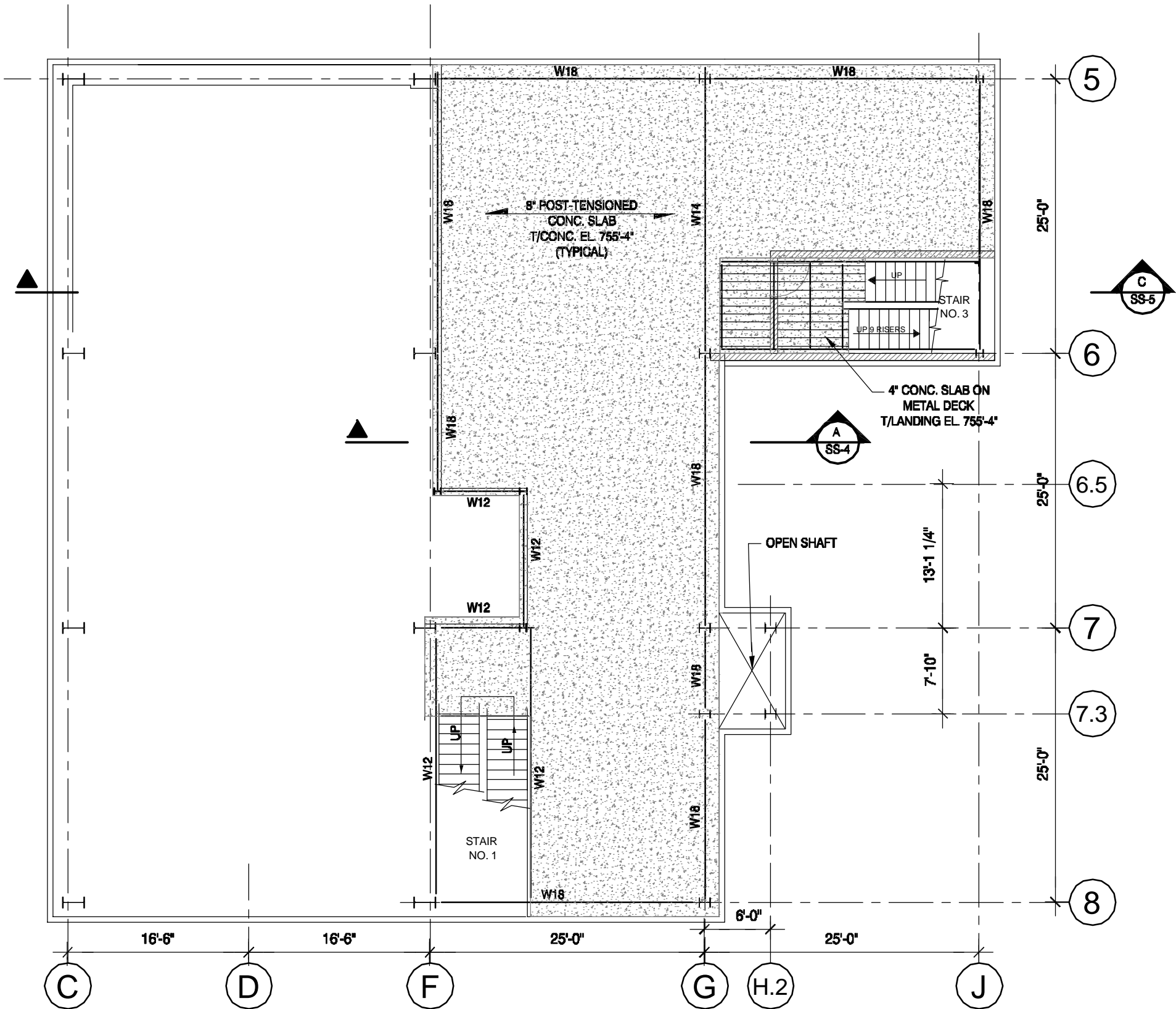
OCTOBER 2004

Dwg: 6-8-3-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.



--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

OCTOBER 2004



T/CONC. ELEVATION 755'-4" (T/STL. -8" U.N.)

			NAME		DATE	
			DESIGNED			
			DRAWN			
			CHECKED			
			APPROVED			
			SUBMITTED			
REV.	DATE	DESCRIPTIONS				
		REVISIONS				

SCALE: 3/32" = 1'-0"

4 0 4 8 12 16 20 24 28

SCALE FEET

PROJECT NORTH

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING

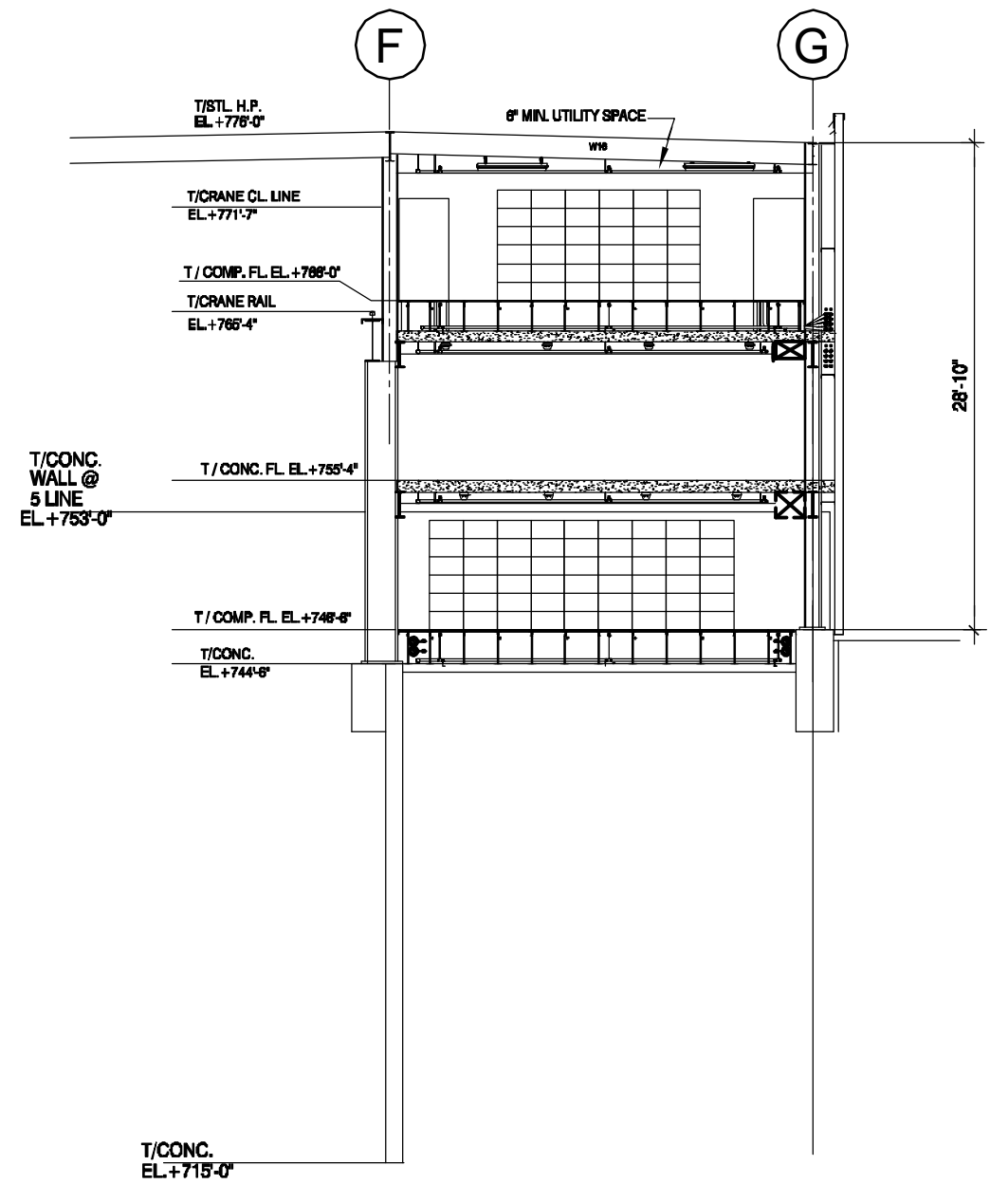
STRUCTURAL PLAN AT 755'-4"

DRAWING NO. **6-8-3** TITLE - 1 **SS-2** REV.

OCTOBER 2004

Dwg: 6-8-B-Tev-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

Dwg: 6-8-B-Tev-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.



SECTION

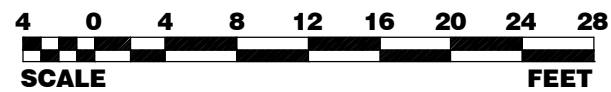
SCALE 3/32"=1'-0"

A
SS-1

SS-2 SS-3

			NAME	DATE
			DESIGNED	
			DRAWN	
			CHECKED	
			APPROVED	
			SUBMITTED	
REV.	DATE	DESCRIPTIONS		
REVISIONS				

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING
BUILDING SECTIONS - SHT. 1

DRAWING NO.

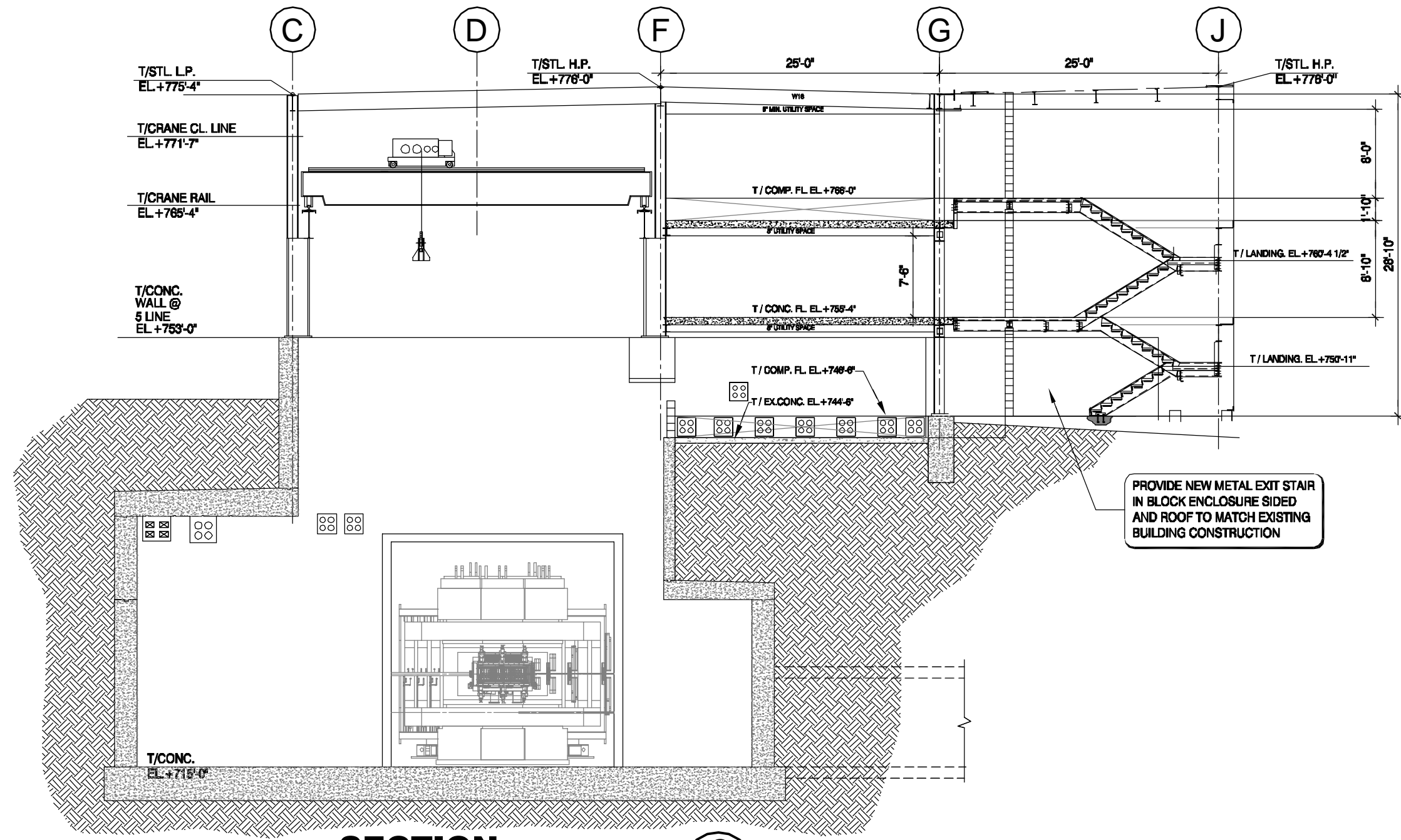
6-8-3

TITLE 1

SS-4

REV.

OCTOBER 2004



SECTION

SCALE 3/32"=1'-0"

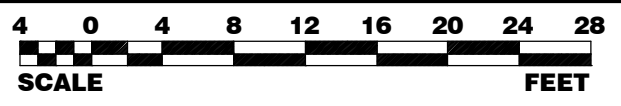
C
SS-1

SS-2 SS-3

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

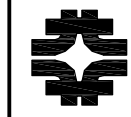
			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
			SUBMITTED		
REV.	DATE	DESCRIPTIONS			
			REVISIONS		

SCALE:
3/32"=1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING
BUILDING SECTIONS - SHT. 2

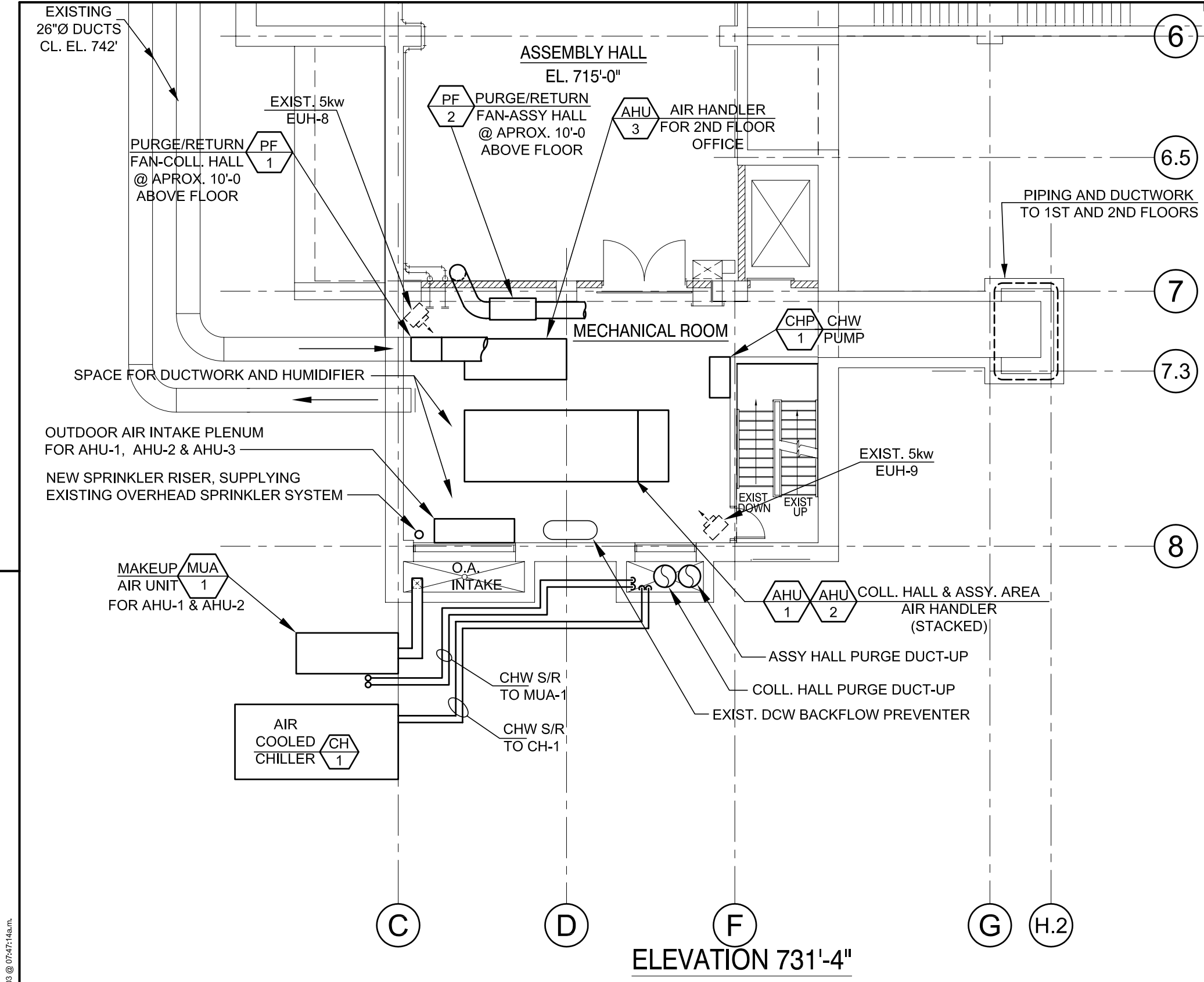
DRAWING NO. **6-8-3**

TITLE - 1

SS-5

REV.

OCTOBER 2004



MECHANICAL ROOM
MECHANICAL HVAC CRITERIA
ENVIRONMENT----- HEATING & VENTILATION
TEMPERATURE --- 60° F to 80°F
TEMPERATURE STABILITY----NONE
HUMIDITY----- UNCONTROLLED
OCCUPANCY----- 0
MAKE UP AIR----- NONE
FIRE PROTECTION CRITERIA
● PROVIDE NEW WET-TYPE AUTOMATIC SPRINKLER SYSTEM DESIGNED TO O.H. PROTECT MECHANICAL ROOM.

GAS SHED (NOT SHOWN)
MECHANICAL HVAC CRITERIA
-----NONE-----
FIRE PROTECTION CRITERIA
-----NONE-----

REV.	DATE	DESCRIPTIONS REVISIONS	NAME	DATE
			DESIGNED	
			DRAWN	
			CHECKED	
			APPROVED	
			SUBMITTED	

SCALE: 3/32"=1'-0"

4 0 4 8 12 16 20 24 28 FEET

SCALE

PROJECT NORTH

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

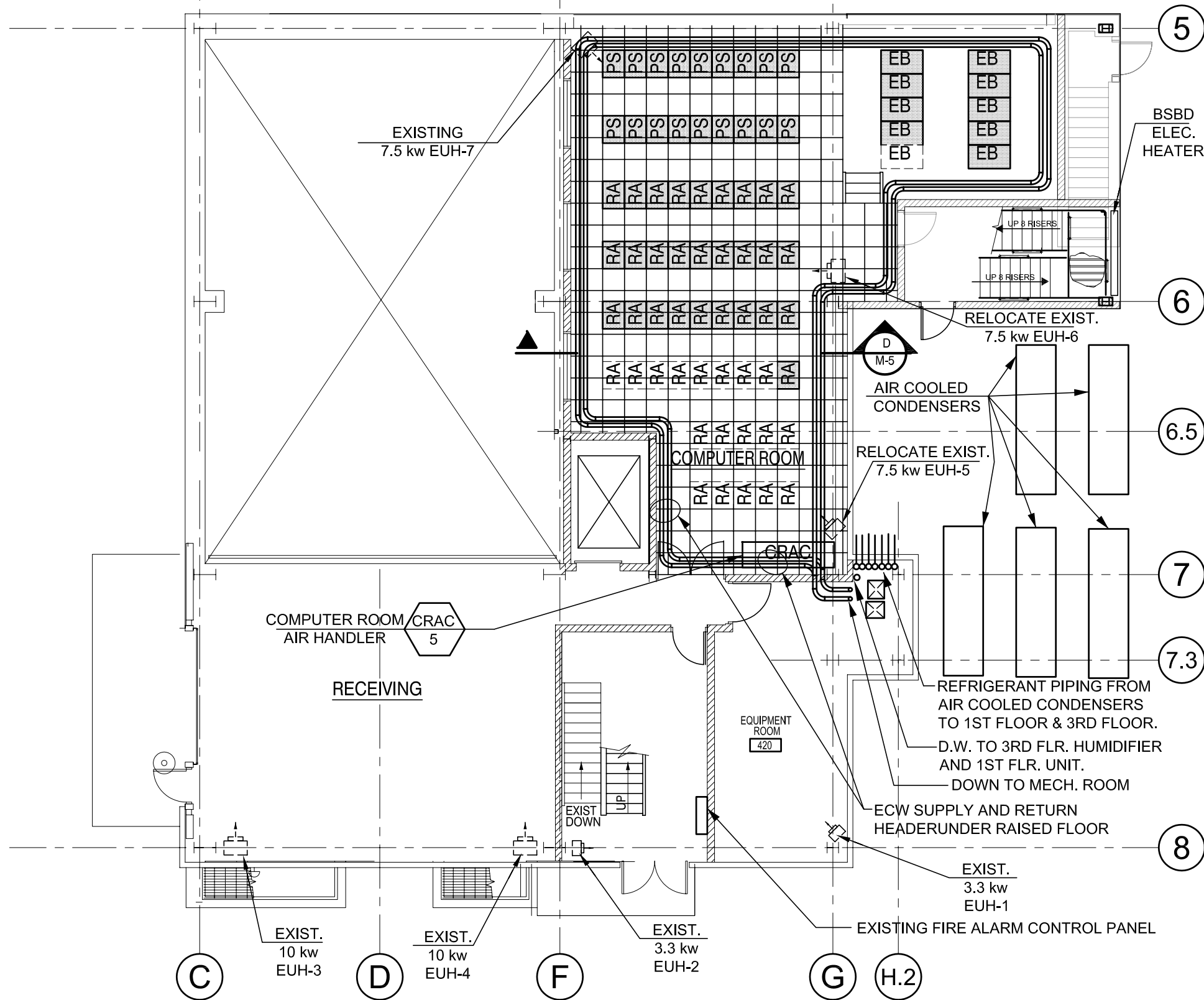
C-O OUTFITTING

MECHANICAL - PLAN AT EL. 731'-4"

DRAWING NO. **6-8-3** TITLE - 1 **M-1** REV.

OCTOBER 2004

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.



ELEVATION 746'-6" U.N.

1ST FLOOR COMPUTER ROOM
MECHANICAL HVAC CRITERIA
ENVIRONMENT--- HVAC (equip load cooled by ECW)
TEMPERATURE - 68F to 75° F
TEMPERATURE STABILITY---NONE
HUMIDITY----- 40% to 50% RH (Max 53F dewpt)
OCCUPANCY----- 5
MAKE UP AIR----- PER ASHRAE 90.1
EQUIP. LOAD ---- 168 KW TOTAL (55° F ECW SUPPLY
NON CONDENSING TO RACKS)
28 RACKS (TOTAL 77 kw)
9 RACKS (TOTAL 91.8 kw)
PS RACKS (minimal)

FIRE PROTECTION CRITERIA

- PROVIDE HIGH VELOCITY SPOT TYPE SMOKE DETECTION ABOVE & BELOW RAISED FLOOR PER NFPA-72.
- PROVIDE WET-TYPE AUTOMATIC SPRINKLER SYSTEM BELOW RAISED FLOOR PER NFPA-13.
- PROVIDE NEW WET-TYPE AUTOMATIC SPRINKLER SYSTEM DESIGNED TO AN ORDINARY HAZARD PER NFPA-13.

UPPER STAGING AREA
MECHANICAL HVAC CRITERIA
HEATING ONLY
FIRE PROTECTION CRITERIA

- EXISTING SYSTEM

EQUIPMENT ROOM
MECHANICAL HVAC CRITERIA
HVAC
FIRE PROTECTION CRITERIA

- PROVIDE NEW WET-TYPE AUTOMATIC SPRINKLER SYSTEM DESIGNED TO AN ORDINARY HAZARD PER NFPA-13.

Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

		NAME	DATE
DESIGNED			
DRAWN			
CHECKED			
APPROVED			
SUBMITTED			
REV.	DATE	DESCRIPTIONS REVISIONS	

SCALE: 3/32"=1'-0"

4 0 4 8 12 16 20 24 28

SCALE

FEET

W
S
E

PROJECT
NORTH

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING
MECHANICAL - PLAN AT EL. 746'-6"

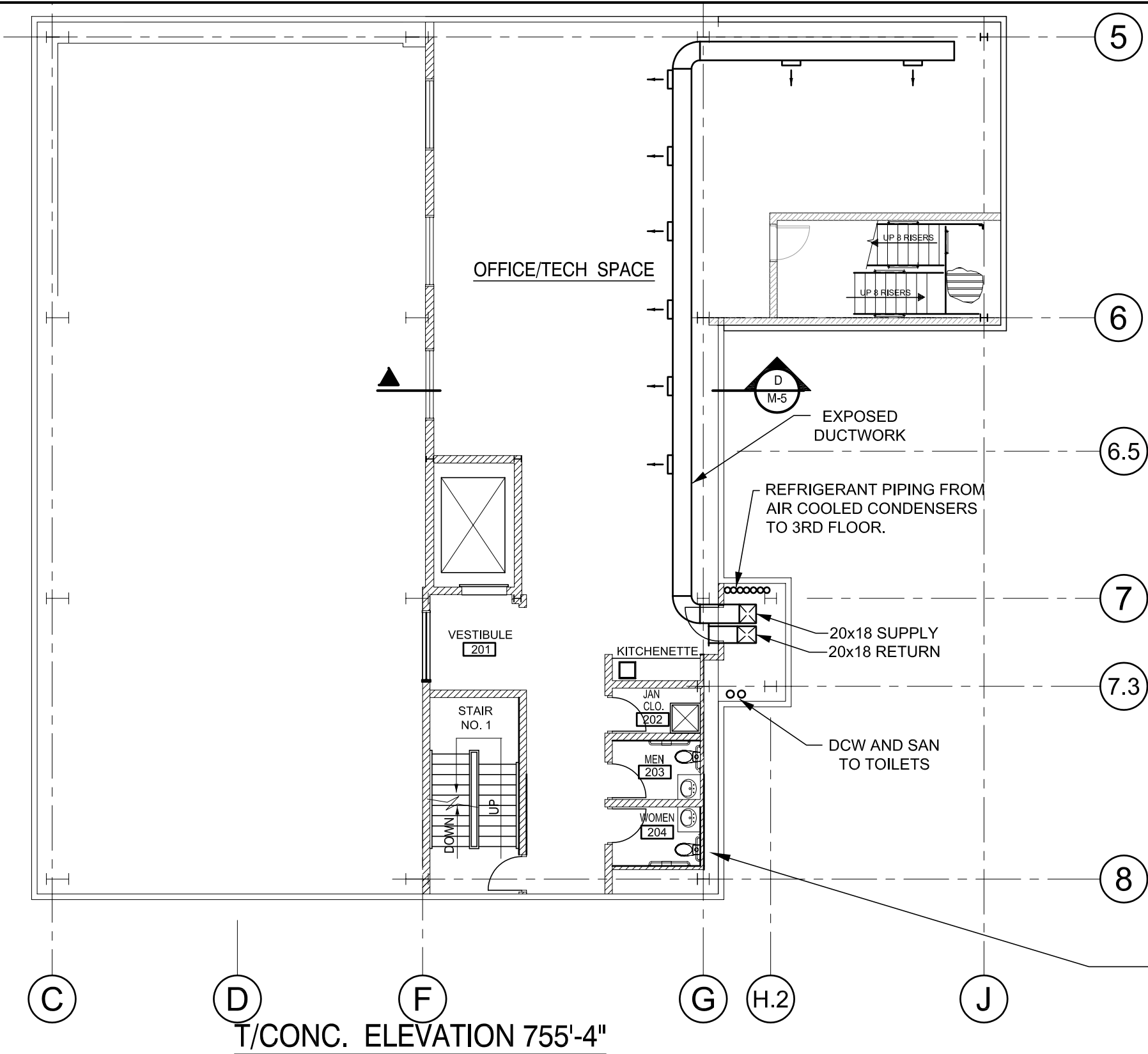
DRAWING NO. **6-8-3**

TITLE - 1

M-2

REV.

OCTOBER 2004



2ND FLOOR OFFICE SPACE
MECHANICAL HVAC CRITERIA
ENVIRONMENT ----HVAC
TEMPERATURE----68°F (winter) - 78°F (summer)
TEMPERATURE STABILITY---NONE
HUMIDITY-----50%RH (summer)-NONE (winter)
OCCUPANCY-----25
MAKE UP AIR-----PER ASHRAE 90.1
EQUIP LOAD-----TYPICAL OFFICE

FIRE PROTECTION CRITERIA

- PROVIDE HIGH VELOCITY SPOT TYPE SMOKE DETECTION PER NFPA-72.
- PROVIDE NEW WET-TYPE AUTOMATIC SPRINKLER SYSTEM DESIGNED TO AN ORDINARY HAZARD PER NFPA-13.

PLUMBING CRITERIA

- ALL PLUMBING SHALL BE INSTALLED IN ACCORDANCE WITH THE ILLINOIS PLUMBING CODE..


Dwg: 6-8-B-TeV-CDR.dwg Plotted: 18DEC03 @ 07:47:14a.m.

		NAME	DATE
DESIGNED			
DRAWN			
CHECKED			
APPROVED			
SUBMITTED			
REV.	DATE	DESCRIPTIONS REVISIONS	

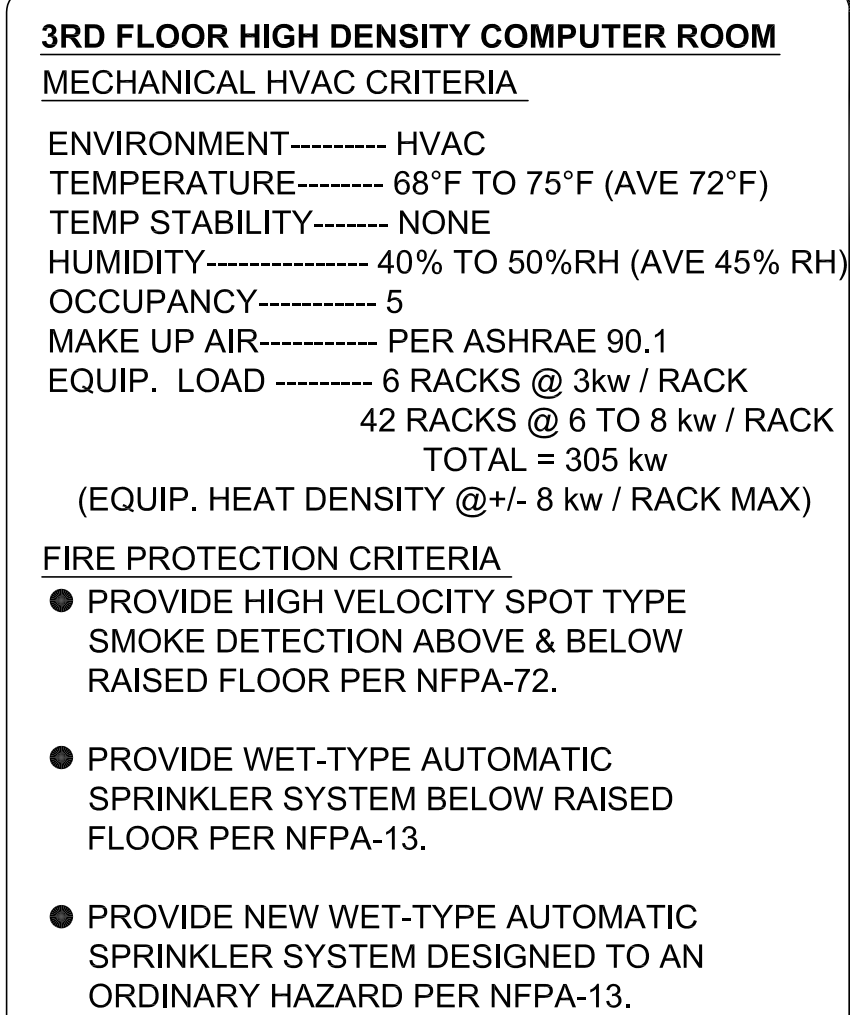
SCALE: 3/32"=1'-0"

4 0 4 8 12 16 20 24 28
SCALE FEET

PROJECT NORTH

FERMI NATIONAL ACCELERATOR LABORATORY			
UNITED STATES DEPARTMENT OF ENERGY			
		C-O OUTFITTING	
		MECHANICAL - PLAN AT EL. 755'-4"	
DRAWING NO.	6-8-3	TITLE - 1	M-3
REV.			

OCTOBER 2004

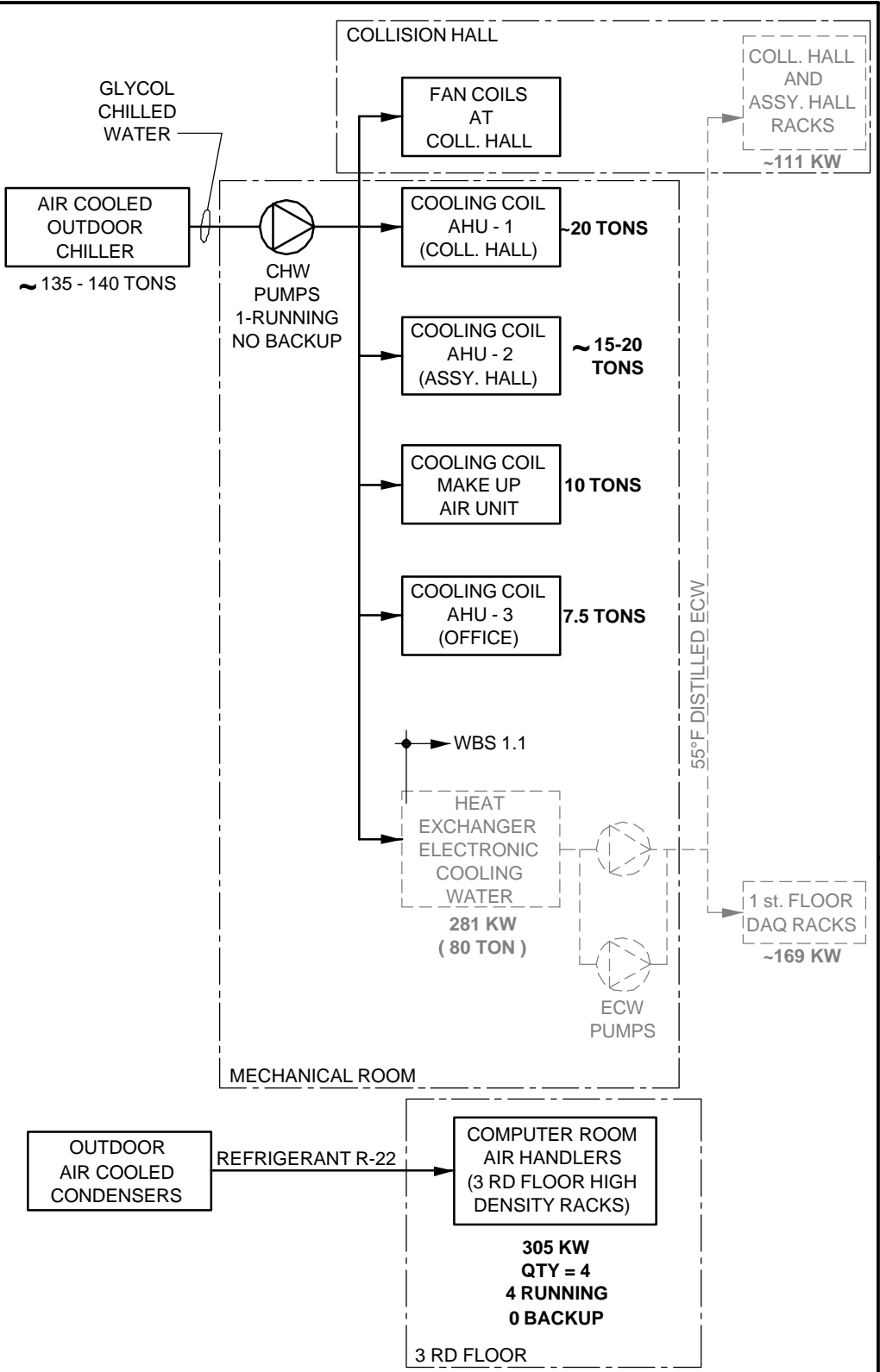
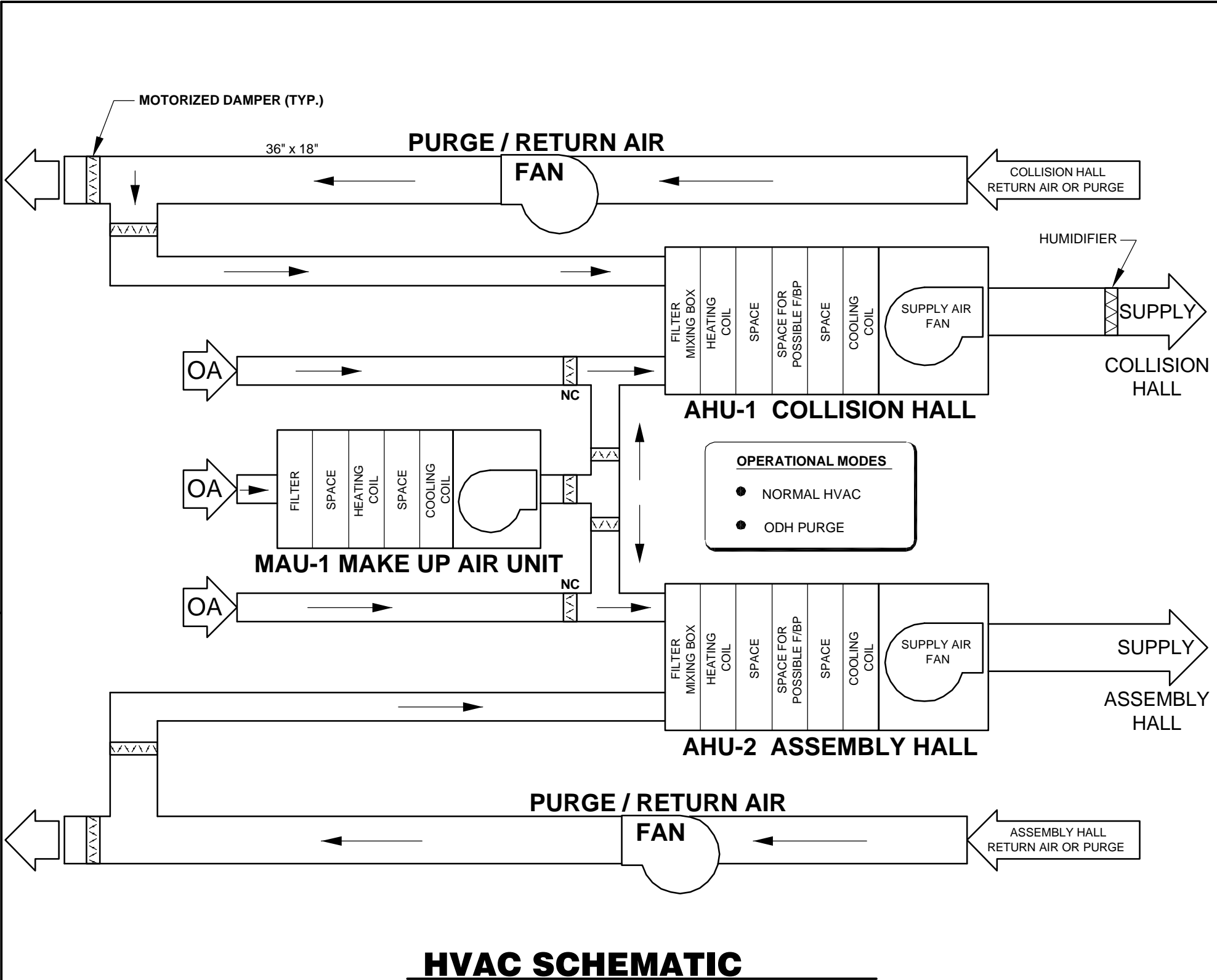
[illegible]

C-O OUTFITTING

MECHANICAL - PLAN AT EL. 766'-0"

REV.

OCTOBER 2004



			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE:

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING
MECHANICAL - HVAC

DRAWING NO. 6-8-3

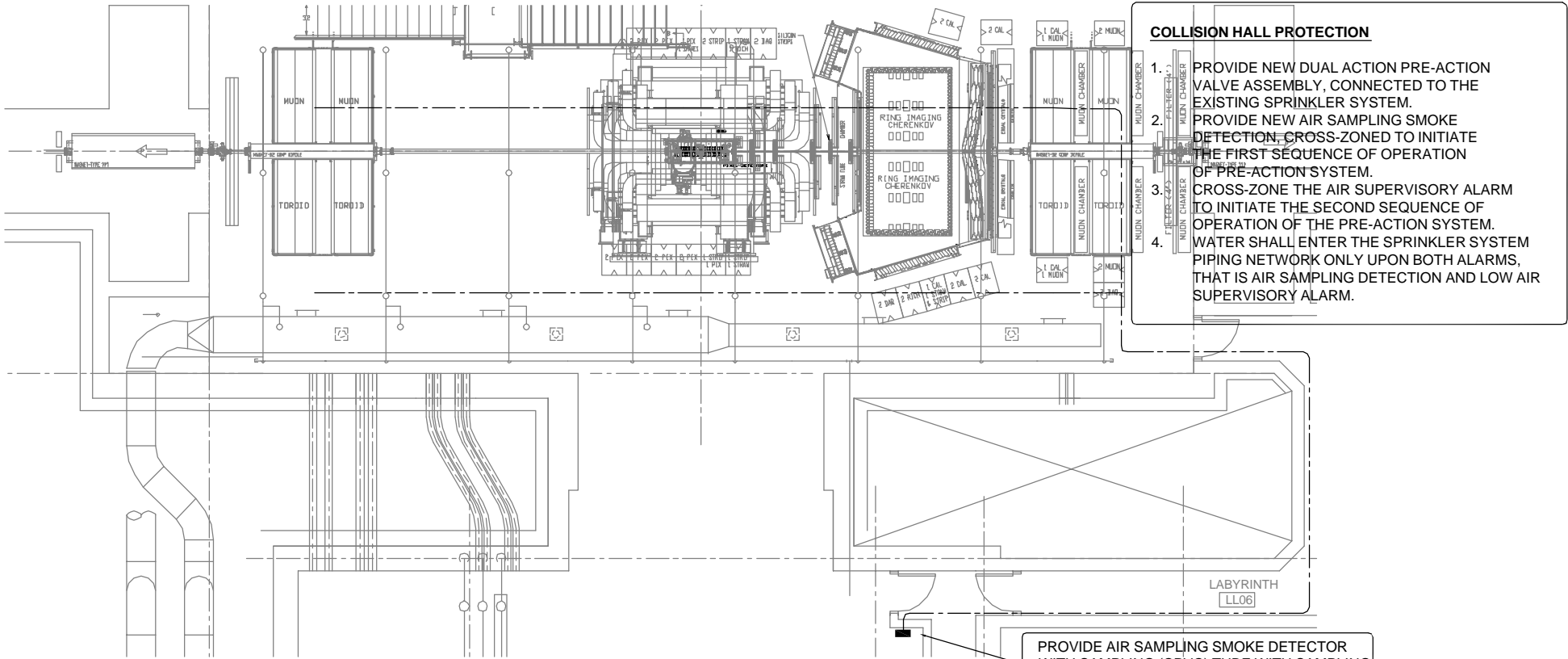
TITLE - 1

M-7

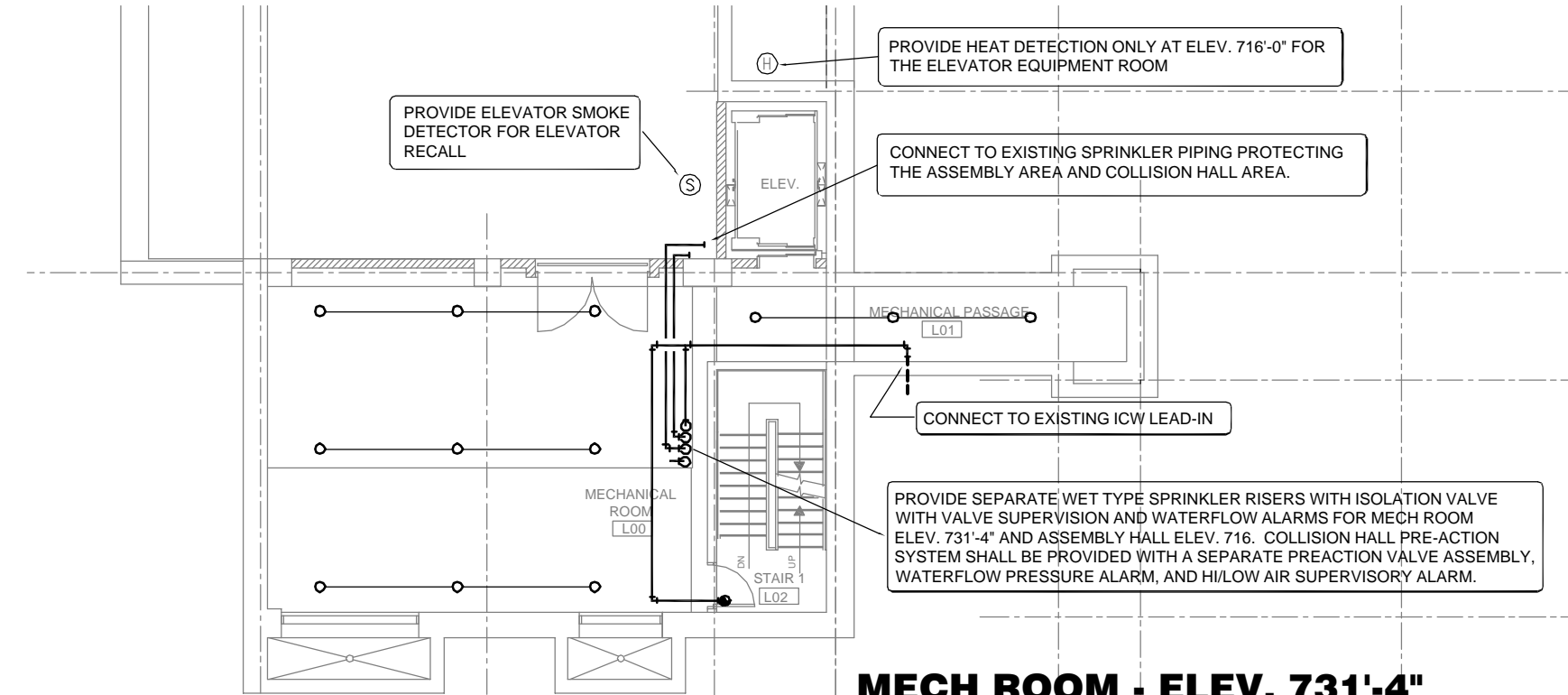
REV.

OCTOBER 2004

Dwg: 6-8-B-TeV-Garvis stair revision CDR.dwg Plotted: 14JAN04 @ 10:29:35a.m.



ASSEMBLY/COLLISION HALL ELEV. 715'-0"



MECH ROOM - ELEV. 731'-4"

COLLISION HALL PROTECTION

1. PROVIDE NEW DUAL ACTION PRE-ACTION VALVE ASSEMBLY, CONNECTED TO THE EXISTING SPRINKLER SYSTEM.
2. PROVIDE NEW AIR SAMPLING SMOKE DETECTION, CROSS-ZONED TO INITIATE THE FIRST SEQUENCE OF OPERATION OF PRE-ACTION SYSTEM.
3. CROSS-ZONE THE AIR SUPERVISORY ALARM TO INITIATE THE SECOND SEQUENCE OF OPERATION OF THE PRE-ACTION SYSTEM.
4. WATER SHALL ENTER THE SPRINKLER SYSTEM PIPING NETWORK ONLY UPON BOTH ALARMS, THAT IS AIR SAMPLING DETECTION AND LOW AIR SUPERVISORY ALARM.

PROVIDE AIR SAMPLING SMOKE DETECTOR WITH SAMPLING (CPVC) TUBE WITH SAMPLING PORTS.

PROVIDE HEAT DETECTION ONLY AT ELEV. 716'-0" FOR THE ELEVATOR EQUIPMENT ROOM

CONNECT TO EXISTING SPRINKLER PIPING PROTECTING THE ASSEMBLY AREA AND COLLISION HALL AREA.

CONNECT TO EXISTING ICW LEAD-IN

PROVIDE SEPARATE WET TYPE SPRINKLER RISERS WITH ISOLATION VALVE WITH VALVE SUPERVISION AND WATERFLOW ALARMS FOR MECH ROOM ELEV. 731'-4" AND ASSEMBLY HALL ELEV. 716. COLLISION HALL PRE-ACTION SYSTEM SHALL BE PROVIDED WITH A SEPARATE PREACTION VALVE ASSEMBLY, WATERFLOW PRESSURE ALARM, AND HI/LOW AIR SUPERVISORY ALARM.

Introduction

This is a building code examination for the BTeV project at the existing C-0 Test Hall. The project includes modifying the existing C-0 Test Hall to accommodate three stories consisting of research laboratory, basement level consisting of mechanical support room, and a sub-basement consisting of a staging area. There will be an elevator for moving people and computer equipment. A typical computer floor is approximately 2,080 sq. ft., the mechanical support room is approximately 300 sq. ft., and the remaining area is 2,540 sq. ft. for a combined total of approximately 9,000 sq. ft. The structure will be approximately 35 feet in height above grade level, that is, of exposed wall and roof construction. The building construction primarily consists of post-tensioned concrete and structural steel beams. There will be two stairways and three exterior doors constructed to accommodate egress. Finally, the building will be equipped with a fully automatic sprinkler system and fire alarm system. This examination excludes the Collision Hall.

Criteria Evaluation

The following was used for the model building code evaluation and requires independent reviews from Fermilab's outside fire protection engineering consultant and in-house comment and compliance review.

- DOE Order 420.1, Fire Protection - Section 4.2
- IBC, International Building Code, 2000 Edition
- NFPA 101, Life Safety Code, 2000 Edition
- NFPA 13, Standard of Installation of Automatic Sprinkler, 1999 Edition
- NFPA 70, National Electrical Code, 2002 Edition
- NFPA 72, Fire Alarm Code, 1999 Edition
- NFPA 75, Standard for the Protection of Information Technology, 2000 Edition
- NFPA 90A, Standard for Installation of Air-Conditioning, 1999 Edition
- ASHRAE Standard 90.1 - 1989
- ANSI 17.1 Safety Code for Elevators and Escalators, 2000 Edition
- Fermilab Environment, Safety and Health (ES&H) Manual
- Fermilab Engineering Standards

Examination

Occupancy Type

The uses will be limited to a research laboratory and as such, is classified by IBC Table 304 and NFPA 101 Section 3.3.134 as a Business Occupancy, "B".

Building Height and Area Limitations

The building will have a complete automatic sprinkler system and as such is allowed to be over three stories, limited to 60-feet in height, per the IBC. The building area is 9,000 square feet, less than the restricted 23,000 square feet permitted by IBC. Therefore, the building height and area is within the building area and height are within IBC Table 503 limitations.

Construction Type

In general, the building will be constructed of steel beams and concrete floors, unprotected and noncombustible. Therefore, the building is a Type II-B construction as defined by IBC, Section 602.2.

Wall and Floor Fire Separation

There is no requirement for fire rating the floors per IBC Section 602 and Section 713

Vertical Opening Fire Separation

The building will have three vertical openings that penetrate the main floors. These openings consist of two stairways and one elevator. The West stairway connecting all three stories will be constructed of a minimum of 1-hour fire resistive construction as defined by IBC Section 707 and 1003. The East stairway connecting all three stories and basements will be constructed of a minimum of 2-hour fire resistive construction as defined by IBC Section 707 and 1003. Both stairways will have a minimum width of 44-inches as outlined in IBC 1003.

The Elevator and utility shaft will be construction of a minimum of 2-hour fire resistive construction in accordance with IBC Section 707. The elevator will be classified as Limited-Use/Limited Application as defined by ANSI 17.1. Power disconnected will be provide in accordance with ANSI 17.1, Section 2.8 and the Emergency Operation and Signaling will comply with ANSI 17.1 Section 5.2.1.27.

Means of Egress

The building will have a minimum of two exits that discharge directly to the outside and two Stairwell exits that will also discharge directly to the outside serving the upper floors. The calculated occupant load for the building per NFPA 7.3.1.2 is 90 persons. The calculated occupant load is based on an occupant load factor of 1 person per 100 sq. ft. gross floor area. The exit capacity is based on the exit doors, each having a clear width of 34-inches in accordance with NFPA 101, Section 7.2.1.2.2. The exit capacity can handle 850 persons and therefore, complies with IBC and NFPA egress requirements.

The travel distance length to an exit is 60-feet and is within the 300-foot limitation of NFPA 101, Section 38.2.6. The common path of travel is approximately 30-feet and is within the 75-foot limitation of NFPA 101, Section 38.2.5.3. The dead corridor at column line 5 and C, is approximately 30-feet and is within the 50-foot limitation of NFPA 101, Section 38.2.5.2.

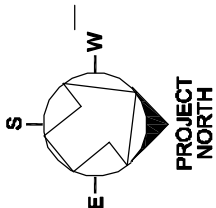
Fire Protection Systems

Automatic sprinkler systems will be an Ordinary Hazard Group 1 installed throughout the facility, and will be designed and installed in accordance with NFPA 13 and the Fermilab Engineering Standards. Fire alarm system will be installed throughout the facility and will be designed and installed in accordance with NFP 72 and the Fermilab Engineering Standards.

Other Building Components

Smoke detection will be installed below the raised computer floors and at the air handling units with automatic shut down of the air handling units, in accordance with NFPA 72, 75, and 90A. Exit signage and emergency lighting will be provided in accordance with NFPA 101. All electrical components will be installed in accordance NEC and Fermilab's standards. Lastly, all air handling and plumbing components will be installed in accordance with IBC, NFPA, ASHRA, and Illinois plumbing code.

SCALE: NONE



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING

PLAN AT 715'-0" AND 731'-4"

DRAWING NO. 6-8-3

TITLE - 1

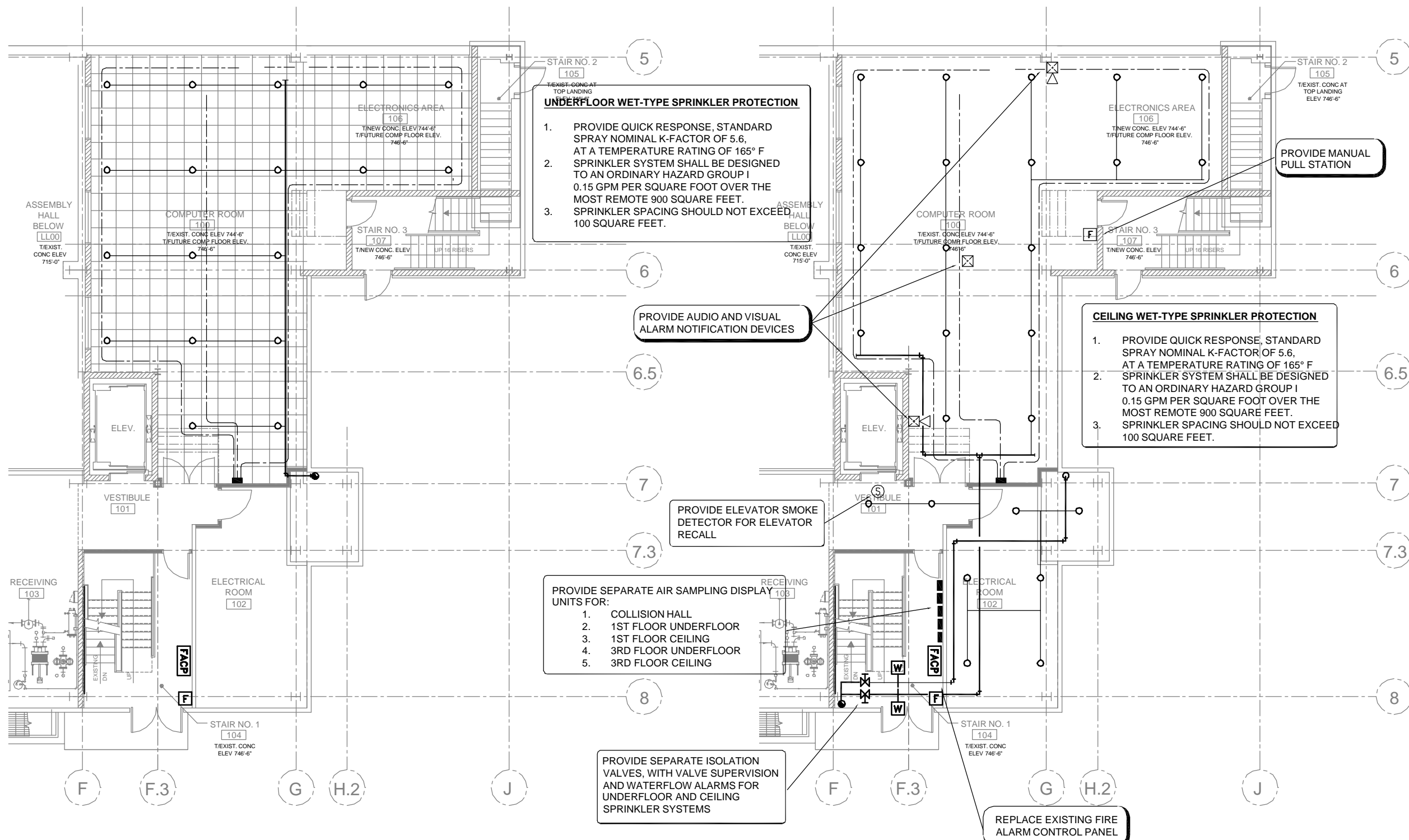
FP-1

REV.

OCTOBER 2004

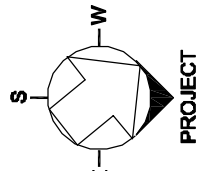

REV.	DATE	DESCRIPTIONS REVISIONS

	NAME	DATE
DESIGNED	J. NIEHOFF	
DRAWN	J. NIEHOFF	
CHECKED		
APPROVED		
SUBMITTED		

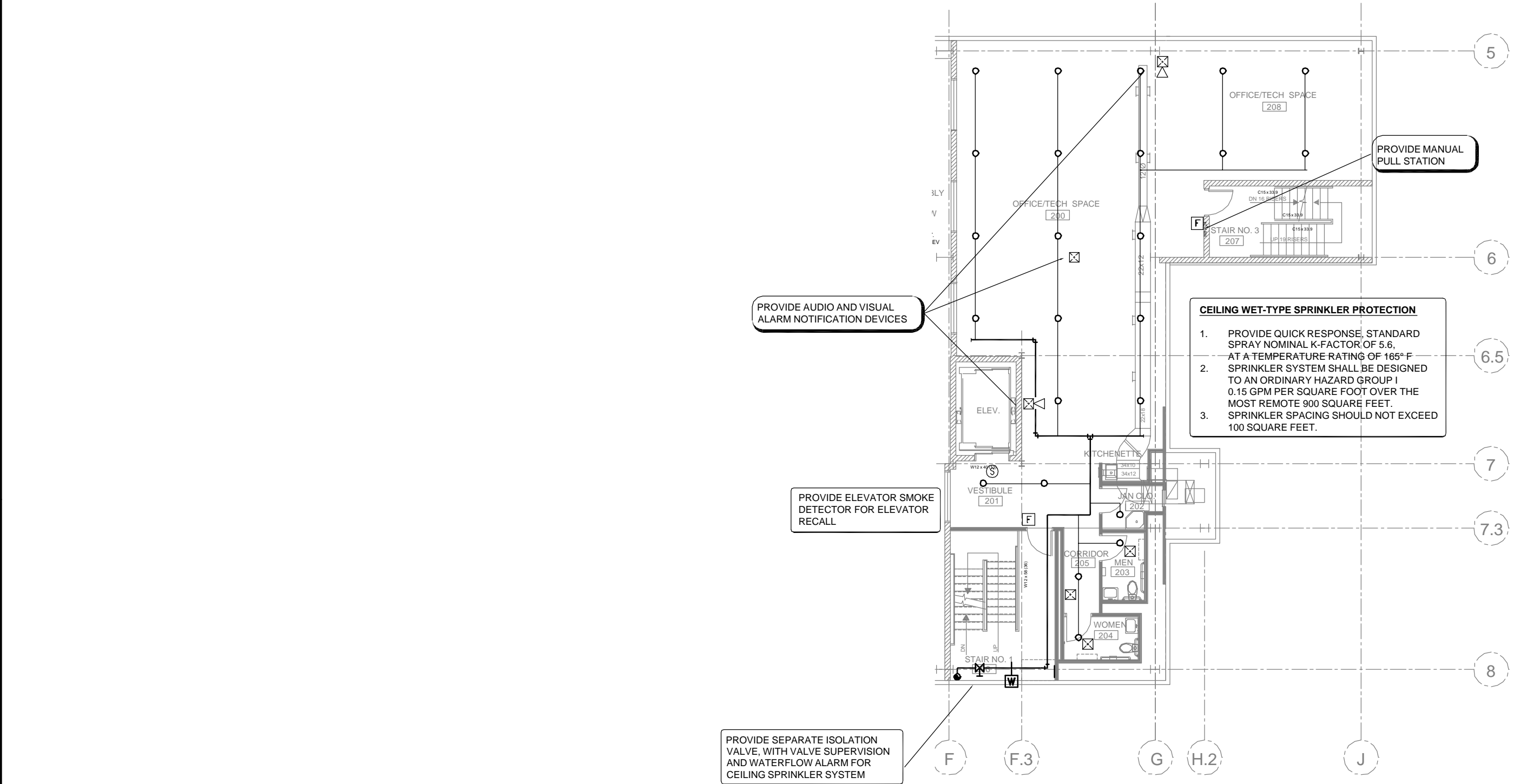


FIRST FLOOR - RAISED FLOOR PLAN

FIRST FLOOR - CEILING PLAN

			NAME		DATE	SCALE: NONE		FERMI NATIONAL ACCELERATOR LABORATORY				OCTOBER 2004
			DESIGNED	J. NIEHOFF				UNITED STATES DEPARTMENT OF ENERGY				
			DRAWN	J. NIEHOFF								
			CHECKED					C-O OUTFITTING				
			APPROVED					FIRST FLOOR EL. 746'-6" - PLANS				
REV.	DATE	DESCRIPTIONS		SUBMITTED		DRAWING NO.	6-8-3	TITLE - 1	FP-2	REV.		
		REVISIONS										

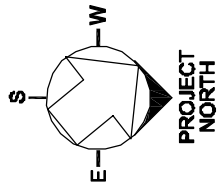
Dwg: 6-8-B-TeV-Garys stair revision CDR.dwg Plotted: 14JAN04 @ 10:29:35a.m.



SECOND FLOOR - CEILING LEVEL

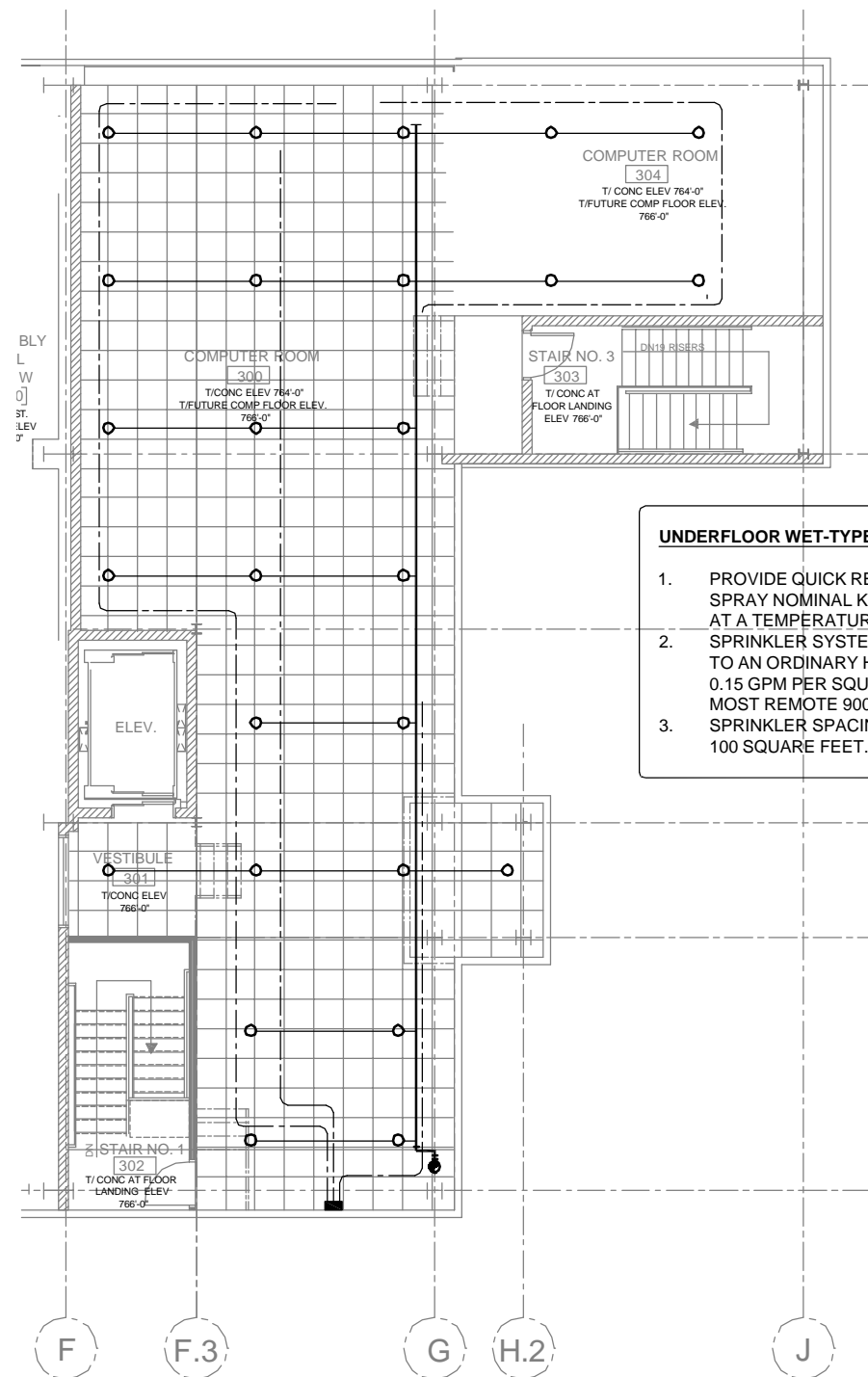
			NAME		DATE
			DESIGNED	J. NIEHOFF	
			DRAWN	J. NIEHOFF	
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE: NONE



FERMI NATIONAL ACCELERATOR LABORATORY			
UNITED STATES DEPARTMENT OF ENERGY			
	C-O OUTFITTING		
	SECOND FLOOR EL. 755'-4" - PLAN		
DRAWING NO.	6-8-3	TITLE - 1	FP-3
			REV.

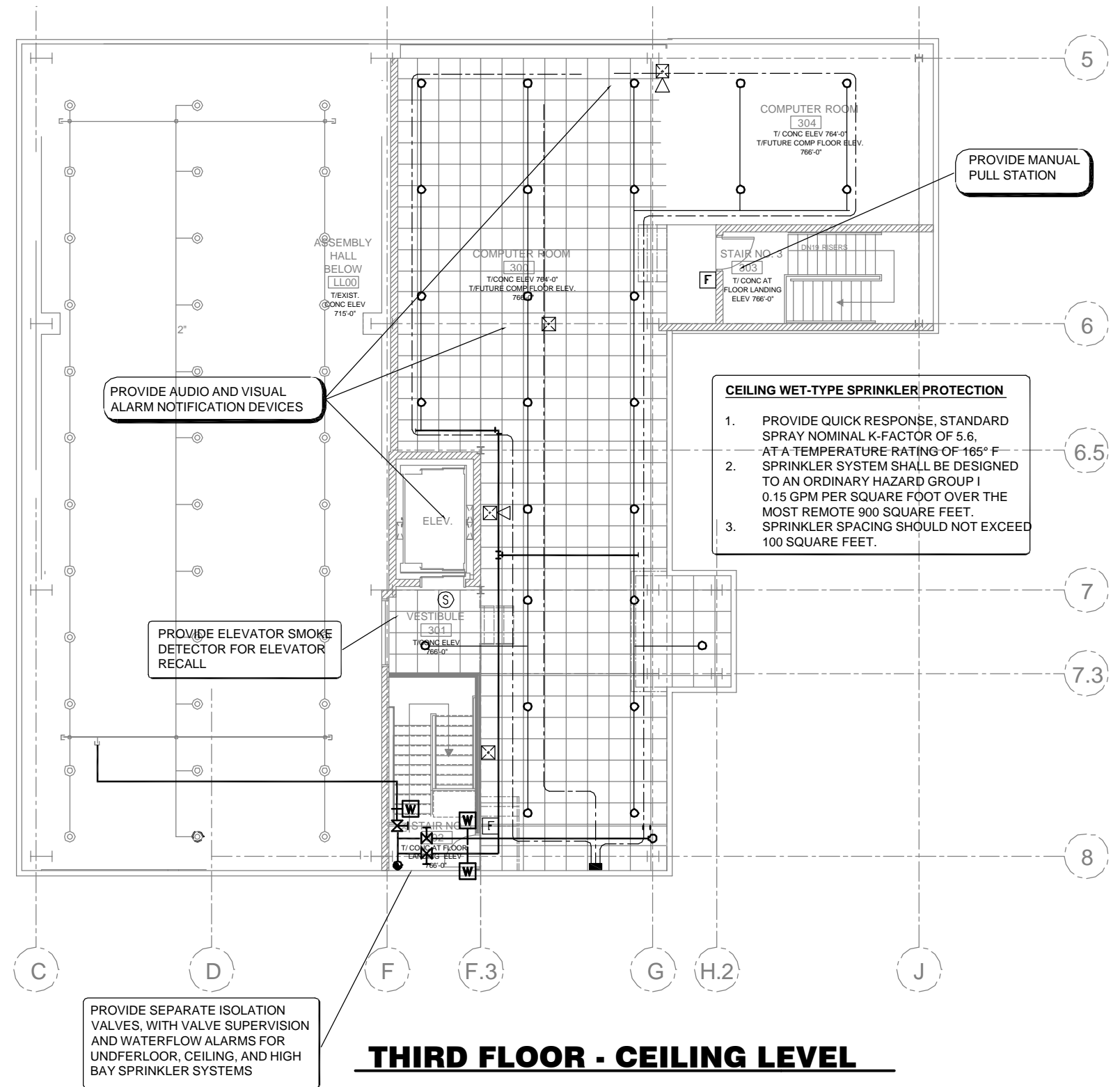
OCTOBER 2004



UNDERFLOOR WET-TYPE SPRINKLER PROTECTION

1. PROVIDE QUICK RESPONSE, STANDARD SPRAY NOMINAL K-FACTOR OF 5.6, AT A TEMPERATURE RATING OF 165° F
2. SPRINKLER SYSTEM SHALL BE DESIGNED TO AN ORDINARY HAZARD GROUP I 0.15 GPM PER SQUARE FOOT OVER THE MOST REMOTE 900 SQUARE FEET.
3. SPRINKLER SPACING SHOULD NOT EXCEED 100 SQUARE FEET.

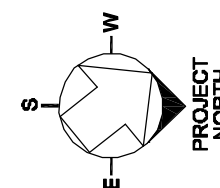
THIRD FLOOR - RAISED FLOOR PLAN



THIRD FLOOR - CEILING LEVEL

			NAME		DATE
			DESIGNED	J. NIEHOFF	
			DRAWN	J. NIEHOFF	
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
		REVISIONS			

SCALE: NONE

**FERMI NATIONAL ACCELERATOR LABORATORY**

UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING

THIRD FLOOR EL. 766'-0" - PLANS

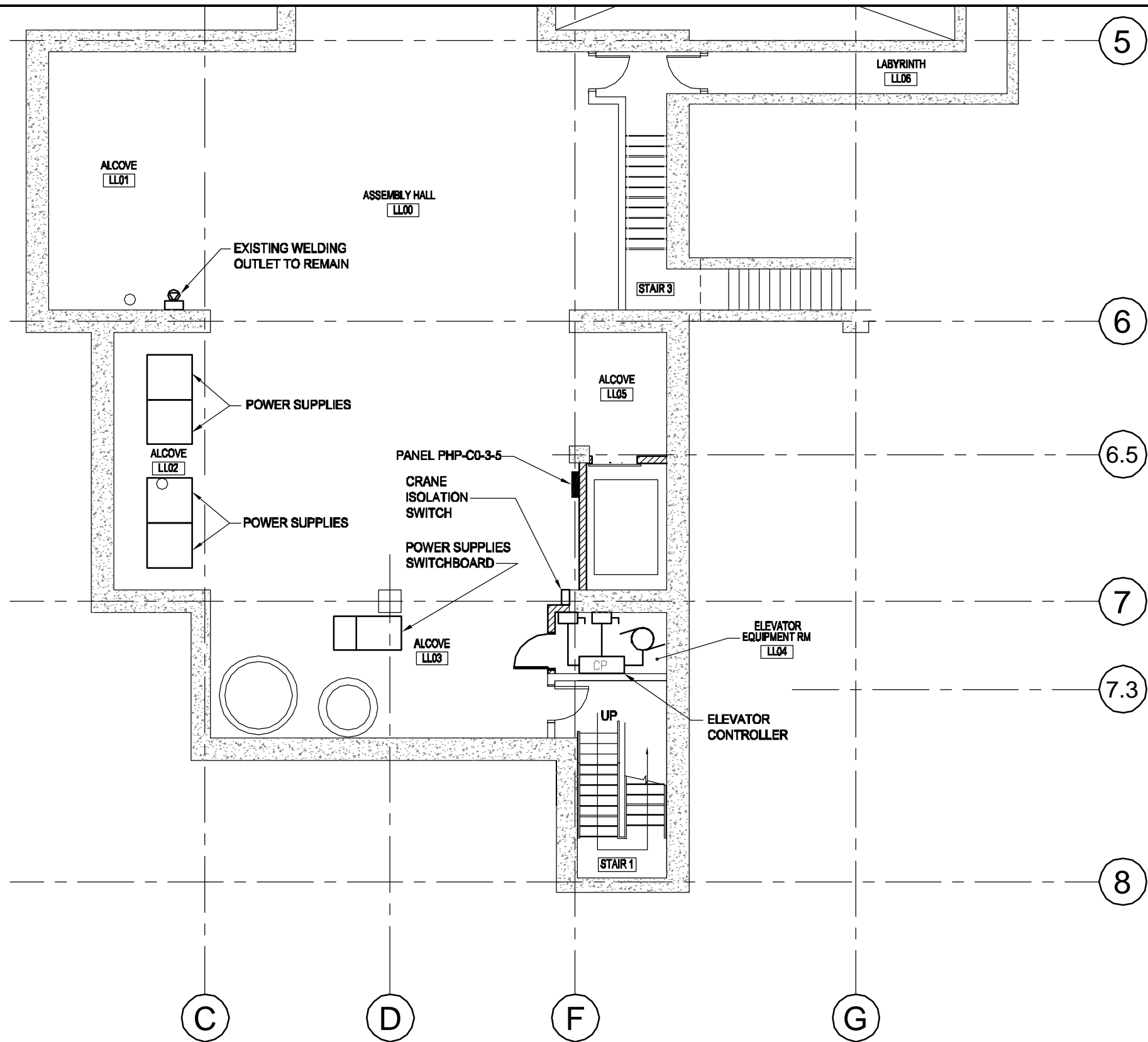
DRAWING NO. **6-8-3**

TITLE - 1

FP-4

REV.

10071129100

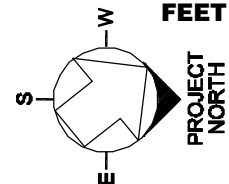
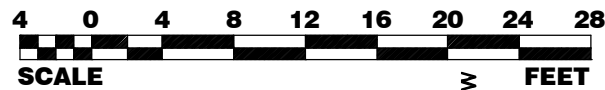


ELEVATION 715'-0"

Dwg: E1-6-8-B-TeV-COR.dwg Plotted: 1/6/SEP04 @ 02:43:59p.m.

			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					

SCALE:
3/32" = 1'-0"



FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY



C-O OUTFITTING
ELECTRICAL - PLAN AT 715'-0"

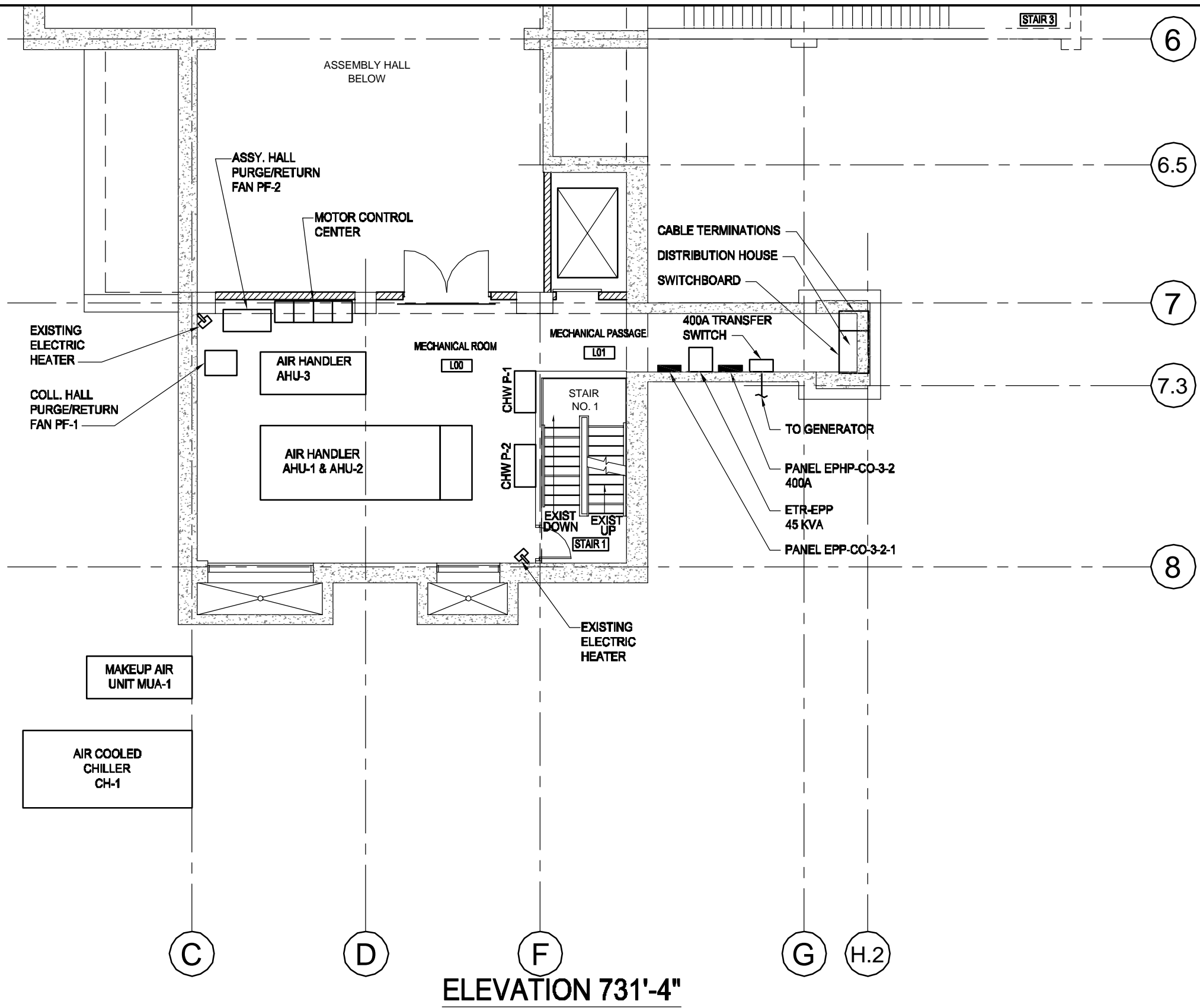
DRAWING NO. 6-8-3

TITLE - 1

E-1

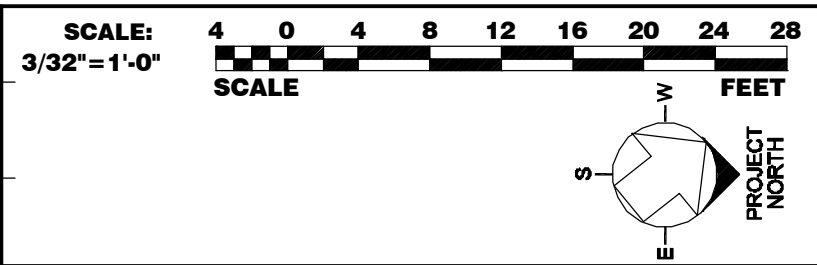
REV.


OCTOBER 2004



Dwg: E2-6-8-B-TeV-CDR.dwg Plotted: 16SEP04 @ 02:44:36p.m.

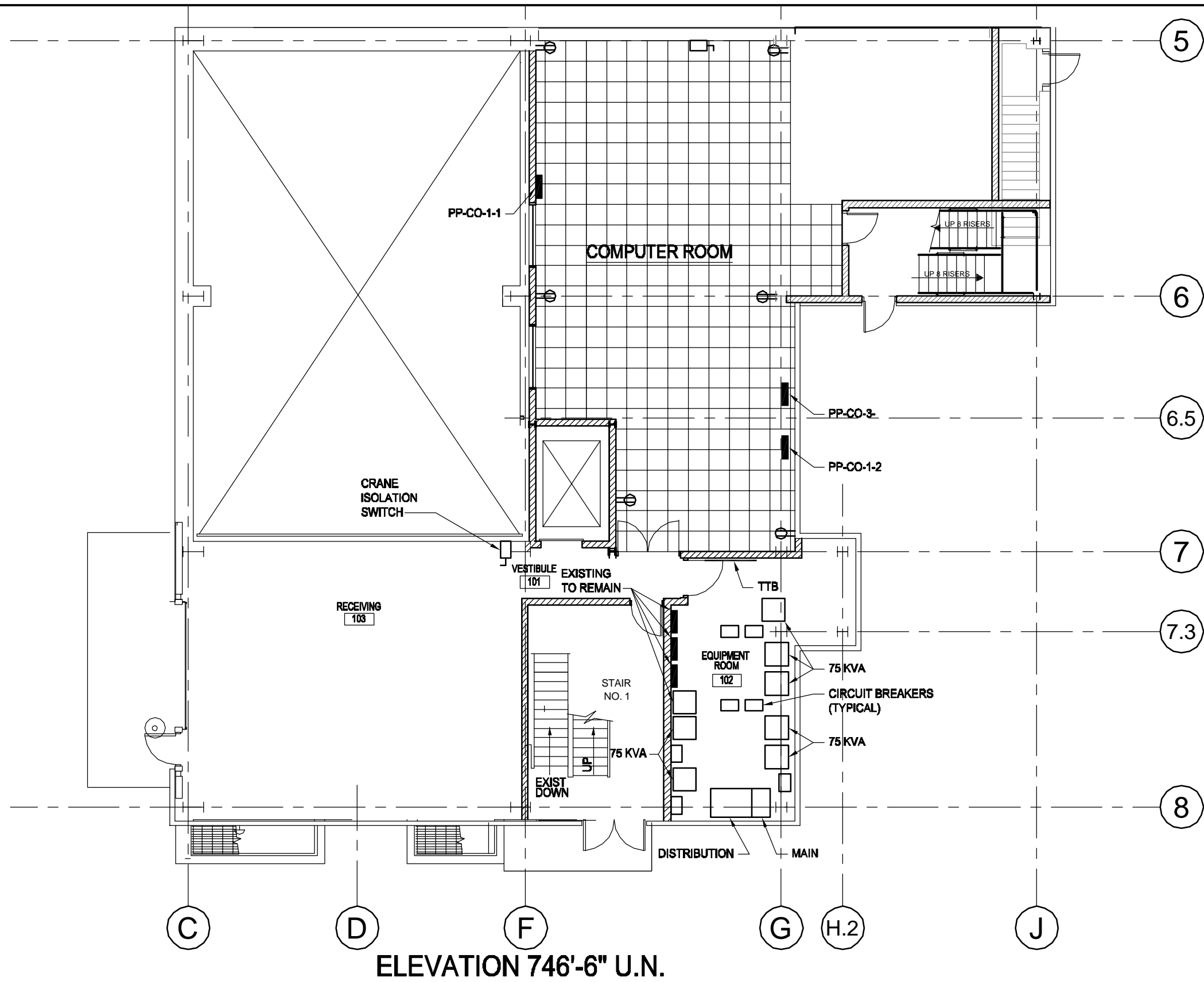
			NAME	DATE
DESIGNED				
DRAWN				
CHECKED				
APPROVED				
SUBMITTED				
REV.	DATE	DESCRIPTIONS		
REVISIONS				



FERMI NATIONAL ACCELERATOR LABORATORY			
UNITED STATES DEPARTMENT OF ENERGY			
		C-O OUTFITTING	
		ELECTRICAL - PLAN AT 731'-4"	
DRAWING NO.	6-8-3	TITLE - 1	E-2
			REV.

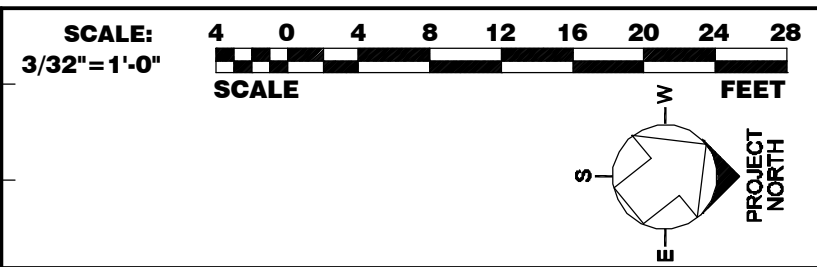
OCTOBER 2004

Dwg: E3-6-8-B-TeV-CDR.dwg Plotted: 16SEP04 @ 02:45:10p.m.



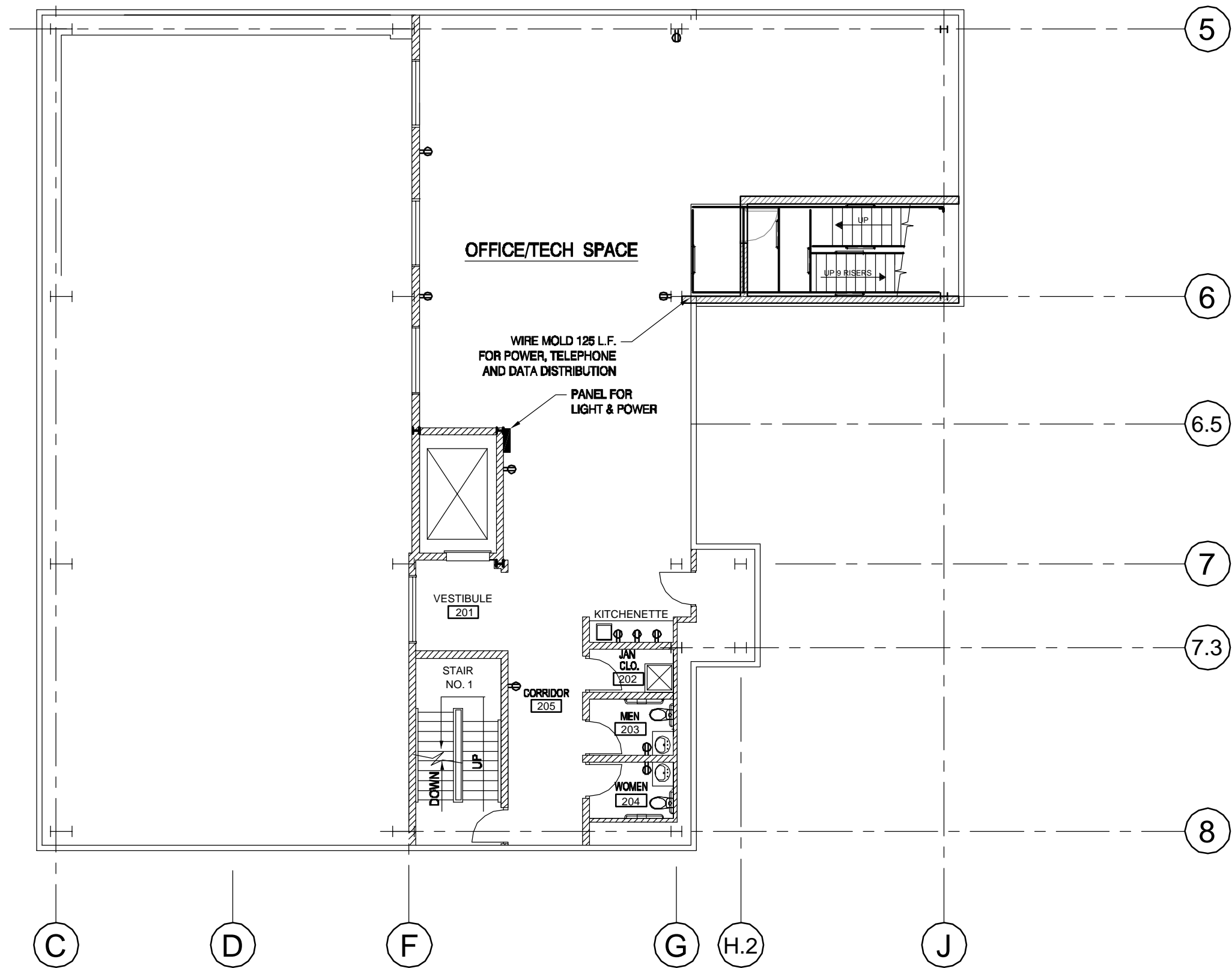
ELEVATION 746'-6" U.N.

			NAME		DATE
			DESIGNED		
			DRAWN		
			CHECKED		
			APPROVED		
REV.	DATE	DESCRIPTIONS	SUBMITTED		
REVISIONS					



FERMI NATIONAL ACCELERATOR LABORATORY			
UNITED STATES DEPARTMENT OF ENERGY			
C-O OUTFITTING			
ELECTRICAL - PLAN AT 746'-6"			
DRAWING NO.	6-8-3	TITLE - 1	E-3
REV.			

OCTOBER 2004



T/CONC. ELEVATION 755'-4"

Dwg: E4-6-8-B-TeV-CDR.dwg Plotted: 16SEP04 @ 02:46:21p.m.

			NAME	DATE
			DESIGNED	
			DRAWN	
			CHECKED	
			APPROVED	
			SUBMITTED	
REV.	DATE	DESCRIPTIONS		
		REVISIONS		

SCALE: 3/32" = 1'-0"

SCALE

4 0 4 8 12 16 20 24 28 FEET

PROJECT NORTH

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

C-O OUTFITTING

ELECTRICAL - PLAN AT EL. 755'-4"

DRAWING NO. **6-8-3**

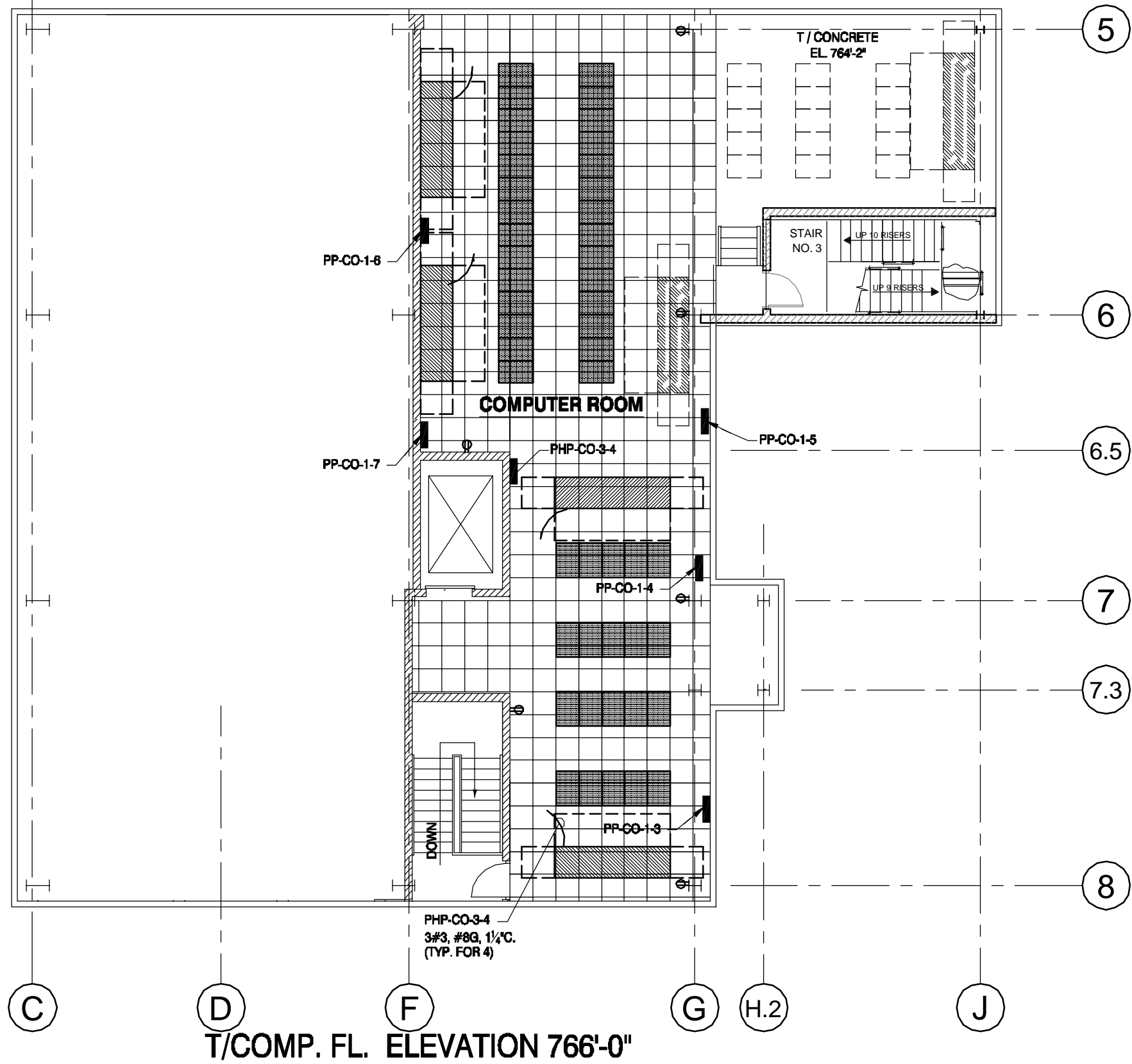
TITLE - 1

E-4

REV.

OCTOBER 2004

Dwg: E5-6-8-B-TeV-CDR.dwg Plotted: 16SEP04 @ 02:46:51p.m.



T/COMP. FL. ELEVATION 766'-0"

			NAME	DATE
DESIGNED				
DRAWN				
CHECKED				
APPROVED				
SUBMITTED				
REV.	DATE	DESCRIPTIONS		
REVISIONS				

SCALE: 3/32" = 1'-0"

4 0 4 8 12 16 20 24 28 FEET

SCALE

W
S
E
PROJECT NORTH

FERMI NATIONAL ACCELERATOR LABORATORY

UNITED STATES DEPARTMENT OF ENERGY

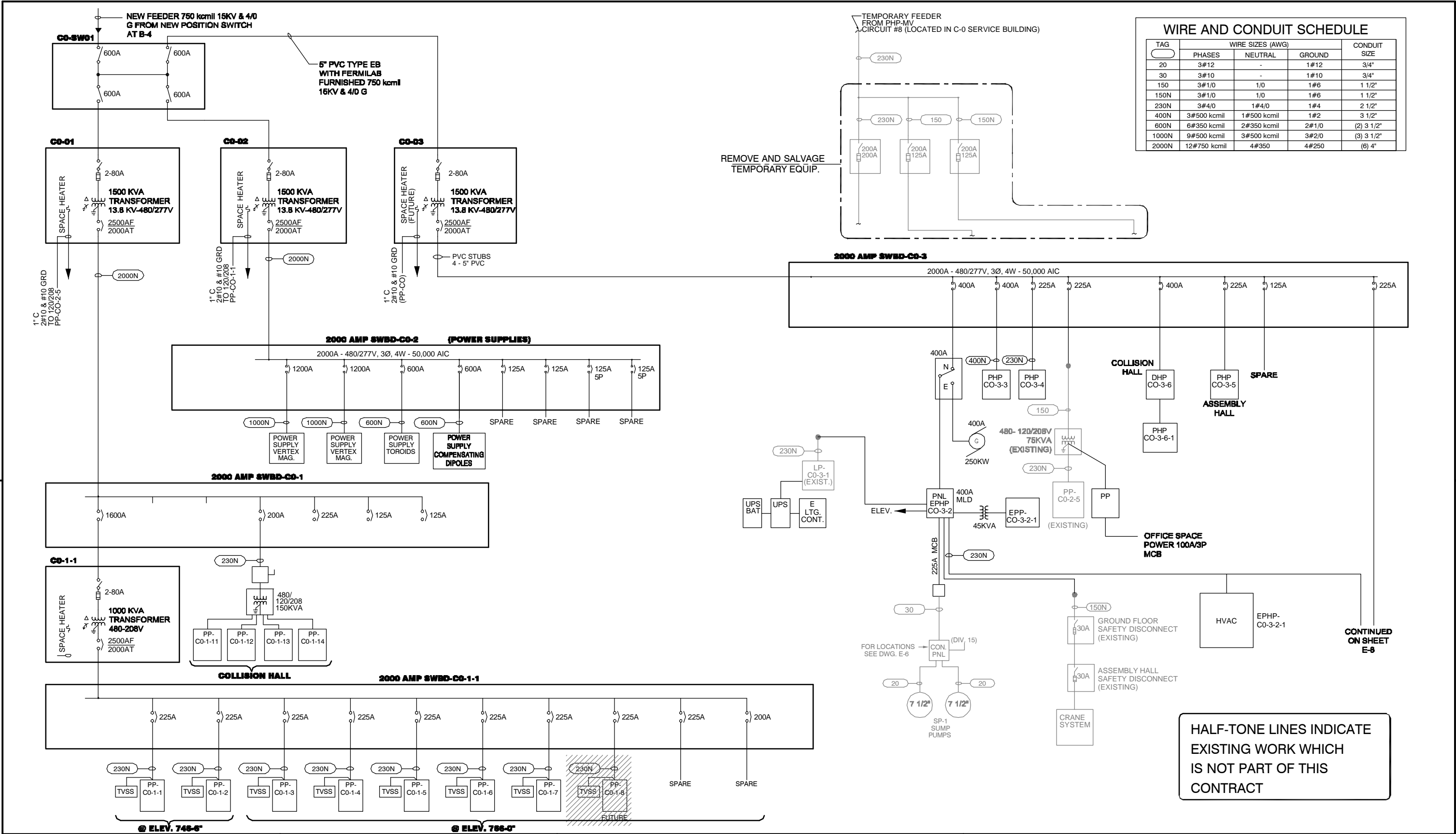
C-O OUTFITTING

ELECTRICAL - PLAN AT EL. 766'-0"

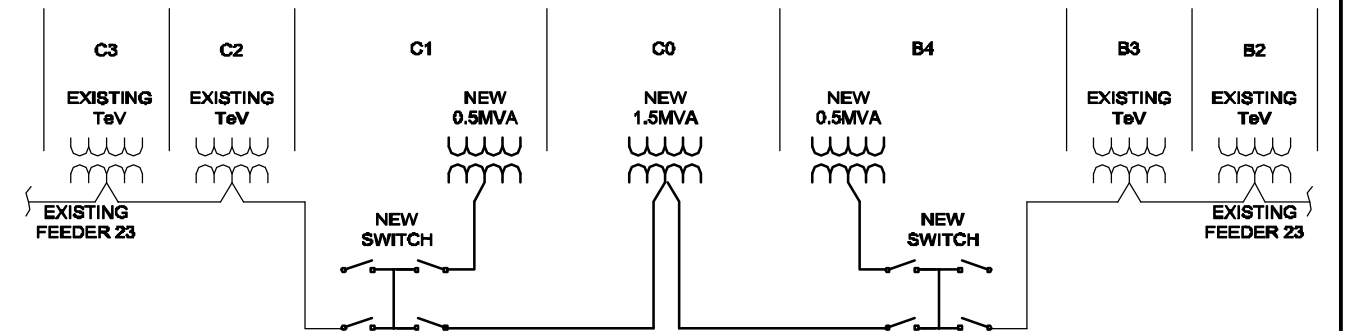
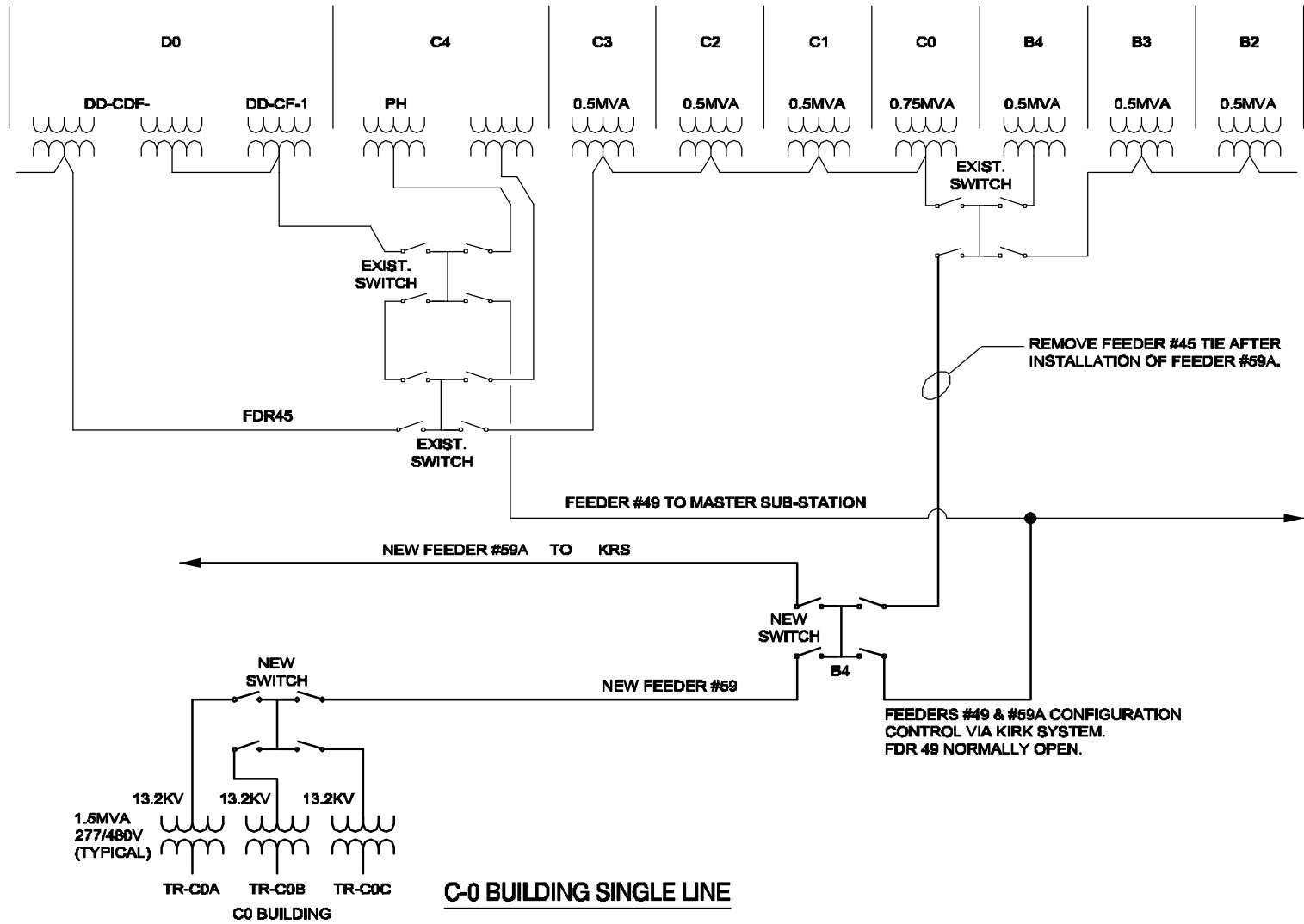
DRAWING NO. **6-8-3** TITLE - 1 **E-5** REV.

OCTOBER 2004

Dwg: E7-6-B-B-TeV-CDR.dwg Plotted: 16SEP04 @ 02:47:55p.m.



REV.		DATE	DESCRIPTIONS	NAME		DATE	SCALE:	FERMI NATIONAL ACCELERATOR LABORATORY		
DESIGNED								UNITED STATES DEPARTMENT OF ENERGY		
DRAWN								C-O OUTFITTING		
CHECKED								ELECTRICAL ONE-LINE DIAGRAM		
APPROVED								DRAWING NO. 6-8-3 TITLE - 1 E-7 REV.		
SUBMITTED							OCTOBER 2004			



IR SINGLE LINE

C-0 BUILDING SINGLE LINE

Dwg: EB-6-B-TeV-CDR.dwg Plotted: 16SEP04 @ 02:48:27p.m.

			NAME		DATE	SCALE:	FERMI NATIONAL ACCELERATOR LABORATORY		
			DESIGNED				UNITED STATES DEPARTMENT OF ENERGY		
			DRAWN					C-0 OUTFITTING ELECTRICAL ONE-LINE DIAGRAM	
			CHECKED						
			APPROVED						
REV.	DATE	DESCRIPTIONS	SUBMITTED				DRAWING NO.	6-8-3	TITLE - 1
REVISIONS								E-8	REV.

OCTOBER 2004

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 1 GENERAL REQUIREMENTS****SECTION 01450 — QUALITY CONTROL****1. INCLUDED:****1.1. Contractor's Field Quality Control**

1.1.1. Field samples and mock-ups constructed, applied, or assembled at the site for review and use as a quality standard.

1.1.2. Field Testing and Inspection Services

1.1.2.1. Soil testing — compaction and density tests of foundation bearing stratum, road and hardstand bases and fill areas.

1.1.2.2 Concrete testing — slump, air entrainment and compressive strength tests for all cast-in place concrete work.

1.1.2.3. Non-Destructive Examination (NDE)

1.2. Contractor's Source Quality Control

1.2.1 Shop Inspection

1.2.2 Material Testing

1.2.3 Fabrication Inspection

2. STANDARDS AND PROCEDURES

2.1. American National Standards Institute (ANSI)

2.2. American Society for Testing and Materials (ASTM)

2.3. American Concrete Institute (ACI)

2.4. American Institute of Steel Construction (AISC)

2.5. American Welding Society (AWS)

3. MATERIALS:

Not Applicable

OUTLINE SPECIFICATIONS

C-0 Outfitting

SECTION 01500 — TEMPORARY FACILITIES AND CONTROLS

1. Included:

1.1 Temporary Utilities

1.1.1. Requirements for installation, maintenance and removal of temporary utilities required and used solely for construction. Would not include utilities constructed for use during construction and later incorporated and utilized in the final facilities.

1.1.3. Includes design, installation, operation, and maintenance of all electrical power distribution works and back-up required for proper lighting of works, minimum lighting standards, and provisions for leaving portions or all of the temporary electrical works in-place at the end of construction for use by follow-on contractors.

1.2. Construction Facilities

1.2.1. Requirements for facilities used on site during construction. Would include field offices and sheds, first aid, sanitary facilities, warehousing, etc.

1.3. Temporary Construction

1.3.1. Requirements for temporary access facilities required to accommodate construction or Fermilab's operations, that are removed, reconstructed, or decommissioned after completion of construction.

1.4. Construction Aids

1.4.1. Requirements for and procedures for tools and equipment used during *construction and* shared *during* construction under multiple subcontracts. Would include construction elevators, hoists, cranes, scaffolding and platforms. Does not include safety-related procedures or subcontractor's means and methods.

1.4.2. Requirements for and procedures related to access and parking facilities required to accommodate construction or the owner's operations, during construction and removed following construction. Would include temporary access roads, haul roads, parking areas, etc.

1.5. Temporary Controls

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 1.5.1. Site or environment controls required allowing construction to proceed. Includes erosion and sediment control *procedures* such as silt fences, temporary ditches, hay bale ditch checks, sediment traps, stabilized construction entrances, etc.

2. STANDARDS AND PROCEDURES

- 2.1. Illinois Department of Transportation (IDOT)
- 2.2. Illinois Environmental Protection Agency (IEPA)
- 2.3. OSHA
- 2.4. American Society of Testing and Materials (ASTM)
- 2.5. Construction Ventilation: Contractor will be required to control dust by wet drilling and other measures.
- 2.6. Construction Lighting
 - 2.6.1. Standards: OSHA: 5 foot-candles - general, Contractor will be required to maintain the system in operation for the length of contract and to turn the system over to Fermilab, who will operate and maintain the system until such time as the permanent electrical and lighting system is functional.

3. MATERIALS

- 3.1 Traffic Barricades: Subcontractor furnished as required with flasher lights.
- 3.2 Aggregate base and subbase, IDOT CA-1 and CA-6.

SECTION 01700 — EXECUTION REQUIREMENTS**1. INCLUDED**

- 1.1. Preparation
 - 1.1.1 Mobilization and demobilization for Construction.
 - 1.1.2 Construction surveying.
 - 1.1.3 Protection of adjacent construction.
- 1.2. Cleaning
 - 1.2.1.1 Site maintenance

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 1.2.1.2. Requirements for maintaining the site in a neat condition during construction.
- 1.2.1.3. Final Cleaning
- 1.2.1.4. Requirements for final cleaning prior to beneficial occupancy by Fermilab.

2. STANDARDS AND PROCEDURES

Not Applicable

3. MATERIALS

Not Applicable

SECTION 02300 — EARTHWORK

1. INCLUDES grading, excavation, embankment, subgrade, soil stabilization and treatment, slope protection and retainment for site facilities and surface contouring. Excavation for roadways, structures, ditches, culverts, foundations and utilities.

1.1. Grading including rough and finish grading. Constructing, shaping and finishing site earthwork.

1.2. Excavation and Fill including extraction, removal, and disposal of material and structures for roadway cuts, channel changes, foundations, and other areas. Includes construction of all fill areas using excavated materials or imported fill materials and compaction of all fill materials.

1.3. Erosion and Sedimentation Control
1.3.1 Erosion Control Blankets or Mats

SECTION 02500 — UTILITY SERVICES

1. INCLUDED

- 1.1. Water Distribution
 - 1.1.1. Industrial Cold Water (ICW): extend and connect to existing industrial cold water system for use in the Building and Collision Hall for fire protection
 - 1.1.2. Domestic Water Service (DWS): extend and connect to existing

OUTLINE SPECIFICATIONS

C-0 Outfitting

domestic water system for use in the Building plumbing system.

- 1.2. Sanitary Sewerage
 - 1.2.1. Sanitary Sewer (SS): extend r for use in the Building plumbing system.
- 1, dehumidification and fuel supply for emergency generator.
- 1.3 Electrical: Extension and connection of existing underground power system.
 - 1.3.1. Primary Power Duct

2. STANDARDS AND PROCEDURES

- 2.1. American Society for Testing and Materials (ASTM)
- 2.2. American Concrete Institute (ACI)
- 2.3. Illinois Department of Transportation (IDOT) Standard Specification
- 2.4. American National Standards Institute (ANSI)
- 2.5. American Waterworks Association (AWWA)
- 2.6. Building Officials and Code Administrators (BOCA)
- 2.7. Commonwealth Edison (CECo) Standards

3. MATERIALS

- 3.1 Buried Electrical Power
 - 3.7.1. Duct: Polyvinyl chloride plastic duct and fittings, Type "EB" for concrete encasement per NEMA Standard T0-6, UL 615A and ANSI/ASTM F-512.
 - 3.7.2. Stub-ups: Rigid galvanized steel, long sweeps, and bends.
 - 3.7.3. Duct Encasement: Minimum 2" spacing between conduits, 3" all around, 2000 psi concrete fill, steel reinforced under roadways and hardstands, red colorant spread across fresh concrete, clean backfill.
 - 3.7.4. Fish Wire: Pull and leave ¼" nylon rope in each duct.
 - 3.7.5. Precast concrete, electric manholes in accordance with ACI, ANSI, ASTM, Commonwealth Edison Co. Standards EM14927 and 04381. Manhole and handholds furnished with duct terminator sections,

OUTLINE SPECIFICATIONS**C-0 Outfitting**

collars, covers and sump pits.

- 3.7.6. Design Requirements: Highway design loading: HS20; Live load for impact: 30%; Coefficient for active lateral earth pressure (K): 0.40; Unit weight of soil: 130 pcf; Ground water elevation: 5 feet below grade level.

SECTION 02700 — BASES, BALLASTS, PAVEMENTS AND APPURTENANCES

1. INCLUDES granular, concrete, bituminous, treated, synthetic, and other materials that comprise the structure; paving, and surfacing for walks, and roads.

1.2. Aggregate Surfacing

1.2.1 Road surface base.

2. STANDARDS AND PROCEDURES

- 2.1. Illinois Department of Transportation (IDOT), Standard Specifications for Road and Bridge Construction

3. MATERIALS

- 3.1. Subbase: CA-1 or nominal 2½" size crushed limestone for roads and hardstands without Geotextile stabilization.
- 3.2. Base: CA-7 or CA-11 for roads and hardstands with Geotextile stabilization. CA-6 for roads and hardstands without Geotextile stabilization.
- 3.4. Aggregate Surface Course: CA-6.
- 3.5. Geotextile: Inorganic, non-woven, heavy fabric, 300 lb. Tensile strength per ASTM D-1682.

OUTLINE SPECIFICATIONS

C-0 Outfitting

DIVISION 3 CONCRETE

SECTION 03100 - CONCRETE FORMS AND ACCESSORIES

1. INCLUDES permanent and temporary forms and falsework for structural and architectural cast-in place concrete. Also includes form liners, coatings, form ties, manufactured joints, anchors, inserts and waterstops.

2. STANDARDS AND PROCEDURES

2.1. American Concrete Institute, ACI 347, "Recommended Practice for Concrete Formwork"

3. MATERIALS

3.1. Clean straight rough lumber for below grade or concealed work.

3.2. Grade "C" plywood or approved commercial forming system for exposed work.

SECTION 03200 — CONCRETE REINFORCEMENT

1. Includes tension, compression and temperature reinforcing steel, welded wire fabric, tendons, and fibrous reinforcing of concrete construction.

2. STANDARDS AND PROCEDURES

2.1. American Concrete institute, ACI — 315, "Manual of Standard Practice for Detailing Concrete Structures".

2.2. American Society for Testing and Materials (ASTM)

3. MATERIALS

3.1. Reinforcing bars, Grade 60, ASTM A-615.

3.2. Welded wire fabric, ASTM A-185.

3.3. Mechanical splices shall be in accordance with the requirements of ACI 315.

SECTION 03300 - CAST-IN-PLACE CONCRETE

1. Includes field cast-in-place concrete mud slabs; service building

OUTLINE SPECIFICATIONS

C-0 Outfitting

footings, grade beams and column piers; floor slabs on grade; retention walls; equipment pads and foundations; concrete driveways and aprons.

2. STANDARDS AND PROCEDURES

2.1. ACI 301, Specifications for Structural Concrete for Buildings; ACI 318, Building Code Requirements for Reinforced Concrete.

3. MATERIALS

3.1. Compressive Strength: 4000 psi at 28 days.

3.2. Cement: Type I ASTM 0-150.

3.3. Fly Ash: ASTM C 618 Types C, F, or N, except carbon content shall not be more than 3% by weight and loss on ignition shall not be more than 6% by weight.

3.4. Aggregates: Clean graded aggregates, ASTM C-33.

3.5. Admixtures: Air-entraining per ASTM 0-260. Water reducing per ASTM 0-494, Type A or D.

3.6. Water: Clean, potable.

SECTION 03366 – Post Tensioned Structural Concrete

1. INCLUDES all labor, material, services and equipment required in conjunction with the design and construction of the post-tensioned concrete slab as shown on the plans and as specified.

1.1 Cast-in-place post-tensioned concrete slabs

1.2 Sheathing-covered tensioning tendons for unbonded system.

2. STANDARDS AND PROCEDURES

2.1 ACI 301 - Specifications for Structural Concrete for Buildings.

2.2 ACI 117 - Standard Tolerances for Concrete Construction and Materials.

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 2.3 ACI 318 - Building Code Requirements for Reinforced Concrete.
- 2.4 ASTM A416 - Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
- 2.5 ASTM A722 - Standard Specification for Uncoated High-Strength Steel Bar for Prestressing Concrete.
- 2.6 AWS B2.1 - Standard for Welding Procedure and Performance Qualification.
- 2.7 CRSI DA1 - (Concrete Reinforcing Steel Institute) CRSI Handbook.
- 2.8 PTI - (Post-Tensioning Institute) Post-Tensioning Manual.
- 2.9 PTI - (Post-Tensioning Institute) Specification for Unbonded Single Strand Tendons.

3. MATERIALS

- 3.1 Tendon Strand: Factory assembled, [complying with PTI "Specification for Unbonded Single Strand Tendons,"] ASTM A416, Grade 270 stranded steel cable; full length without splices
- 3.2 Concrete Mix Design: As specified in Section 03300

SECTION 03600 — GROUT

- 1. INCLUDES thin, fluid, shrink resistant, mortar-like materials used for filling joints and cavities and setting and anchoring items in masonry and concrete. Also includes catalyzed metallic grout, epoxy grout, nonmetallic grout, and shrink resistant grout.
- 1.1. Grouting of building columns, miscellaneous steel items and electrical and mechanical equipment.

OUTLINE SPECIFICATIONS

C-0 Outfitting

2. STANDARDS AND PROCEDURES

- 2.1. ACI 301, Specifications for Structural Concrete for Buildings
- 2.2. ACI 318, Building Code Requirements for Reinforced Concrete.

3. MATERIALS

- 3.1. Design Mix: 5000 psi at 28 days for cementitious grouts. 5000 psi at 24 hours for epoxy grouts.
- 3.2. Cement: Type I or Type II, ASTM C-ISO.
- 3.3. Epoxy: Pre-proportioned, factory-packaged products.
- 3.4. Aggregates: Clean uniformly graded sand, ASTM C-33.
- 3.5. Water: Clean, potable

DIVISION 4 MASONRY

SECTION 04200 — MASONRY UNITS

1. INCLUDES

- 1.1. Non-reinforced unit masonry assemblies
 - 1.1.1 Stair Enclosure walls
 - 1.1.2 Building interior partition walls.

2. STANDARDS AND PROCEDURES

- 2.1. American Concrete Institute (ACI)
- 2.2. National Concrete Masonry Association (NCMA)

3. MATERIALS

- 3.1. Blocks: Normal weight, hollow units, Type 1, Grade N, ASTM C-90.
- 3.2. Mortar: ASTM C-270, Type “M” in the Tunnel, Type “5” in the Service Buildings.

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 3.3. Grout: ASTM C-476, minimum compressive strength of 2500 psi in 28 days.
- 3.4. Aggregates: For mortar, sand: ASTM C-144, for grout: ASTM C-404.
- 3.5. Bonding and Joints: Running bond, concave tooled joints.
- 3.6. Horizontal Joint Reinforcement: Truss type, "Dur-O-Wal", 9 gage, galvanized steel wire, ASTM A-82.
- 3.7. Lintels: Precast concrete or lintel block with steel reinforcing and concrete or grout fill.
- 3.8. Masonry Ties and Anchors: Galvanized steel, as manufactured by Dur-O-Wal, Hohmann-Barnard or AA Wire Products.

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 5 METALS****SECTION 05120 —STRUCTURAL STEEL**

1. INCLUDES fabricated structural steel framing.
 - 1.2. Building structural steel support framing including columns, beams, bracing and girts.
2. STANDARDS AND PROCEDURES
 - 2.1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", Ninth Edition.
 - 2.2. AWS D1.1, "Structural Welding Code"
3. MATERIALS
 - 3.1. Structural shapes, plates and bars: ASTM A-36 or ASTM A-572, Grade 50
 - 3.2. Structural tubing: ASTM A-500 Grade "B"
 - 3.3. Structural pipe: ASTM A-53 Grade "B" or ASTM A-501
 - 3.4. High strength structural bolts: ASTM A-325
 - 3.5. Common bolts and anchor bolts: ASTM A-307 or A-36
 - 3.6. Nuts for high strength bolts: ASTM A-563 DH
 - 3.7. Welding electrodes: E 7018
 - 3.8. Paint: Rust inhibitor lead free shop primer; touch up primer in field after erection, field finish paint, two coats of alkyd enamel.

SECTION 05300 —METAL DECK

1. INCLUDES metal floor and roof deck of fluted, ribbed, and cellular configurations.
 - 1.1. Galvanized steel deck for building roof.
2. STANDARDS AND PROCEDURES

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 2.1. American Society for Testing and Materials (ASTM)
 - 2.1.1. A446 - Specification for Steel Sheet, Zinc Coated (galvanized) by the Hot Dip Process, Structural Quality.
 - 2.1.2. A525 - Specification for Steel Sheet, Zinc Coated (galvanized) by the Hot Dip Process, General Requirements
- 2.2. American Welding Society (AWS): DI .3 Structural Welding Code- Sheet Steel
- 2.3. Steel Deck Institute (SDI)

3. MATERIALS

- 3.1. Roof Deck: Intermediate rib, 1½", 20 gage, minimum, ASTM A-446 for Class I roof construction, Factory Loss Prevention Data Sheet 1-28 and standard 1-90.
- 3.2. Finish: Galvanized per ASTM A-525, G-90; field finish paint with two coats alkyd enamel.

SECTION 05500 — METAL FABRICATIONS

1. INCLUDES metal items manufactured to conventional details from standard metal shapes and plates that are not considered structural items including metal stairs and ladders, handrails and railings, gratings, floor plates, stair tread and nosings, and miscellaneous fabricated metal items.

- 1.1 Stairway, landings and handrail.

2. STANDARDS AND PROCEDURES

- 2.1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings", Ninth Edition.
- 2.2. AWS D1.1, "Structural Welding Code"

3. MATERIALS

- 3.1. Structural shapes, plates and bars: ASTM A-36
- 3.2. Tubing: ASTM A-500 Grade "B"

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 3.3. Pipe: ASTM A-53 Grade "B" or ASTM A-503.
- 3.4. High strength structural bolts: ASTM A-325
- 3.5. Common bolts and anchor bolts: ASTM A-307 or A-36
- 3.6. Nuts for high strength bolts: ASTM A-563 OH
- 3.7. Welding electrodes: E 7018.
- 3.8. Removable and Stationary Guard Rails: Clear plastic panel mounted to a welded to a steel angle frame with joints ground smooth.
- 3.9. Vehicular guards: 6" diameter concrete filled galvanized steel pipe embedded 3'-6" in concrete.
- 3.10. Handrails: 1 ½" OD, Schedule 40 pipe, welded and ground smooth.
- 3.11. Paint: Rust inhibitor lead free shop primer; touch up primer in field after erection, field finish paint, two coats of alkyd enamel

OUTLINE SPECIFICATIONS

C-0 Outfitting

DIVISION 6 CARPENTRY**SECTION 06100 — ROUGH CARPENTRY**

1. INCLUDES wood framing, sheathing, and decking using timber, lumber, and engineered wood products.

1.1 Treated wood nailers.

1.2 Miscellaneous blocking, backing, screeds, nailers and plywood liners.

2. STANDARDS AND PROCEDURES

3. MATERIALS

3.1. Rough lumber: Construction grade, Number 1 or 2, type Douglas Fir or Southern Pine, S4S

3.2. Exterior plywood: APA graded trademarked C-ID grade *or better manufactured* with exterior grade glue.

3.3. Treated lumber: No. 1 or No. 2 construction grade hemlock, pine, or fir,

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 7 THERMAL & MOISTURE PROTECTION SECTION 07100—****SECTION 07210 — BUILDING INSULATION**

1. INCLUDES building insulation applied for thermal protection in walls, under concrete slabs on grade, foundation perimeter, vapor retarders, and roof and deck insulation. Insulation furnished as part of roof or wall assemblies is not included.

1.1. Loose fill insulation in masonry walls.

1.2. Insulation board under building addition floor and slab and perimeter foundation grade wall.

1.3. Semi-rigid insulation for metal wall panels

2. STANDARDS AND PROCEDURES

2.1. American Society for Testing and Materials (ASTM)

0516 Specification for Vermiculite Loose Fill Insulation

C549 Specification for Perlite Loose Fill Insulation

E84 Test for Surface Burning Characteristics of Building Materials

3. MATERIALS

3.1. Rigid Board Insulation at Exterior Foundation Wall: 2" thick, 2.0 pcf density, foil faced both sides, a 5 year aged product R-value of 16 at 40°F mean temperature.

3.2. Semi-rigid Insulation for Metal Wall Panels: Glass fiber, minimum 1.65 pcf density providing a minimum aged product R-value of 10 at 75°F mean.

3.3. Roll-type Insulation: Roll type insulation for filling miscellaneous areas shall be 3-1/2" thick unfaced fiberglass insulation having a minimum R-value of 11.

SECTION 07410 — METAL ROOF AND WALL PANELS

1. INCLUDES metal siding, wall panels and roof panels. Does not include metal floor and roof deck.

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 1.1. Pre-finished, field assembled metal wall panels for building exterior siding.
- 1.2. Interior metal liner panels
- 1.3. Sub-girts.
- 1.4. Pre-finished and pre-formed metal closures, trim, flashing and cap flashing.
- 1.5. Neoprene closures.
- 1.6. Pre-finished and pre-formed metal scuppers, downspouts and gutters.

2. STANDARDS AND PROCEDURES

2.1. Assembly: Flush face, interlocking panels with an R-value of 14; Wind load design of 25 psf with a deflection limit of L/180. Maximum flame spread rating of 25 and maximum smoke developed rating of 50 when tested in compliance with ASTM E84; Air infiltration per NAAMM TM-1-68T; 0.12 cfm at 1" water pressure; Water penetrations per ASTM E-331.

3. MATERIALS

3.1. Exterior face: Minimum 20 gage, galvanized, stucco embossed steel conforming to ASTM A446 Grade A and ASTM A525 G-90 zinc coating designation with a silicone polyester finish coating. Panels shall be flush face with positive, interlocking joints furnished in single piece full lengths.

3.2. Interior face: Minimum 20 gage, galvanized, stucco embossed steel conforming to ASTM A446 Grade A and ASTM A525 G-90 zinc coating designation a factory standard off-white polyester finish coating. Panels shall be smooth faced and furnished in single piece full lengths.

SECTION 07510 — BUILT-UP BITUMINOUS ROOFING

1. INCLUDES roofing systems composed of alternating layers of *bituminous* sheets and viscous bituminous coatings applied over a rigid insulation board and surfaced with stone ballast.
 - 1.1. Roof insulation board, flat and tapered installed over steel roof deck.
 - 1.2. Metal and rubber flashing and metal copings with fasteners.

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 1.3. Cant strips and saddles.
- 1.4. Vapor retarder, 4-ply built-up fiberglass felts and gravel surfacing.
- 1.5. Installation of sheet metal accessories built into the roofing.
- 1.6. Roofing sealants.
- 1.7. Roof walkway *mats*.
2. STANDARDS AND PROCEDURES
 - 2.1. Roof Class: Class 1-90, Factory Mutual Loss Prevention Data Sheet 128 for decks and 1-29 for membranes.
 - 2.2. National Fire Protection Association (NFPA):
NFPA 80 Fire Doors and Windows
NFPA 101 Life Safety Code
3. MATERIALS
 - 3.1. Insulation: Minimum two layers of a closed cell urethane or isocyanurate composite rigid foam board providing a minimum aged thermal resistance "R" value of 10.0 per two inch thickness.
 - 3.2. Mechanical Fasteners: Galvanized and FM approved for the specified wind uplift classification.
 - 3.3. Bitumen: ASTM D-312, Type II for insulation installation, roofing membrane and glaze coat; Type I for flood coat.
 - 3.4. Base Felts and Ply Felts: Asphalt impregnated glass fiber conforming to ASTM D2178.
 - 3.5. Cements: Flashing cement conforming to ASTM D-2822 or Federal Specification
55-C-i 53.
 - 3.6. Aggregate: Clean, dry, dust free and free of sharp corners, conforming to ASTM D1863, washed gravel at 400 lb./sq.
 - 3.7. Walkway Mats: 24" x 12" x 0'-3/4" mats of asphalt fiber and fillers.

OUTLINE SPECIFICATIONS

C-0 Outfitting

SECTION 07600 — FLASHING AND SHEET METAL

1. INCLUDES sheet metal accessories and trim, and specialties associated with roofing, and metal and other flexible flashings for roof and wall construction.
 - 1.1. Miscellaneous flashing, counter-flashing and closures.
 - 1.2. Formed gravel stop/facia.
 - 1.3. Formed coping covers.
 - 1.4. Formed roof ballast retainers.
 - 1.5. Roof corner flashing closure
 - 1.6. Formed roof scuppers, gutters, and downspouts.
2. STANDARDS AND PROCEDURES
 - 2.1. American Society for Testing and Materials (ASTM)
3. MATERIALS
 - 3.1. Steel sheet steel conforming to ASTM A-525 galvanized G90 coating.
 - 3.2. Nails, wood screws, metal screws, and machine screws shall be galvanized or stainless steel.

SECTION 07700 — ROOF SPECIALTIES AND ACCESSORIES

1. INCLUDES standard manufactured components and accessories installed on or in roofing.
 - 1.1. Roof access hatch
2. STANDARDS AND PROCEDURES
 - 2.1. American Society for Testing and Materials (ASTM):
 - A446 Specification for Steel Sheet, Zinc Coated (galvanized) by the Hot-Dip Process, Structural Quality.
 - A525 Specification for Steel Sheet, Zinc Coated (galvanized) by the Hot-Dip Process, General Requirements

OUTLINE SPECIFICATIONS**C-0 Outfitting****3. MATERIALS**

3.3. Roof Access Hatch: Completely assembled with heavy pintle hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles and padlock hasps inside and outside, a neoprene rubber draft seal and fully insulated. Cover shall be minimum 14 gauge-galvanized steel with a red oxide primer equipped with a vinyl grip handle for one (1) hand release. Scuttle curb shall be 12" in height and of 14 gauge galvanized sheet metal.

SECTION 07800 — FIRE AND SMOKE PROTECTION

1. INCLUDES fire stopping and smoke seals and fire-resistant coatings and assemblies. Specialized coatings, mineral fiber, cementitious coverings, and board materials to provide fire resistance to building components. Materials installed in cavities, around penetrations, and openings to prevent spread of fire and smoke.

1.1. Safing insulation at fire rated details.

1.2. Firestop sealing

2. STANDARDS AND PROCEDURES

2.1. American Society for Testing and Materials (ASTM)

3. MATERIALS

3.1. Sating Insulation: Minimum 4.0 pcf density with a maximum flame spread rating of 15, fuel contribution rating of zero (0), and smoke development rating of zero (0) in accordance with ASTM E-84.

3.2. Firestop Sealant: One-part silicone elastomer, UL listed meeting the requirements of ASTM E814.

3.3. Firestop Foam: Two-part silicone liquid elastomer, UL listed meeting the requirements of ASTM 814.

SECTION 07900 — JOINT SEALERS

OUTLINE SPECIFICATIONS**C-0 Outfitting**

1. INCLUDES preformed joint seals, sealants, caulking compounds and related accessories.
 - 1.1. Waterproofing sealants at penetrations through concrete walls, roof, and floor slab.
 - 1.2. Joints between adjacent dissimilar materials normally expected to be sealed.
 - 1.3. Door frames.
 - 1.4. Firestop sealing.
 - 1.5. Thresholds.
 - 1.6. Perimeter of door frames.
 - 1.7. All joints of exterior metal siding and flashing.
 - 1.8. All penetrations through metal siding panels, roof deck, concrete and masonry walls, and floor slab.
 - 1.9. Concrete floor joints.
 - 1.10. Between all toilet room vanities and adjacent surfaces.
2. STANDARDS AND PROCEDURES
 - 2.1. Joint sealant materials shall be the product of a single manufacturer with sealants and associated accessory materials compatible with the actual joint and installation conditions.
3. MATERIALS
 - 3.1. Joint Filler: Closed cell, synthetic foam strip or backer rod.
 - 3.2. Caulking: Silicone, polysulfide or polyurethane, color matched. Fire sating and intumescent sealant at penetrations through fire rated floors and partitions.
 - 3.3. Backer Rod: Compressible rod stock of premolded or extruded closed-cell polyethylene foam, butyl rubber foam, neoprene foam or urethane foam compatible with the primer and sealant to be used.
 - 3.4. Primer: Of the type recommended by the sealant manufacturer to provide

OUTLINE SPECIFICATIONS**C-0 Outfitting**

adhesion of the sealant and to prevent staining of adjacent surfaces.

3.5. General Purpose Interior Sealant: One-component polyurethane based, non-sagging sealant conforming to Federal Specification TT-S-00230, Type II and ASTM 0920.

3.6. General Purpose Exterior Sealant: One-component silicone, non-sagging sealant conforming to Federal Specification TT-S-001 543 and ASTM 0920.

3.7. Concrete Floor Joints: Two-component, self-leveling polyurethane sealant conforming to Federal Specification TT-S-00227, Type I and ASTM 0920.

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 8 DOORS & WINDOWS****SECTION 08100 — METAL DOORS AND FRAMES**

1. INCLUDES standard and custom hollow metal doors and frames, fire-rated and non-fire-rated.
 - 1.1. Labeled and non-labeled flush panel hollow metal doors and frames for interior applications.
 - 1.2. Insulated, non-labeled flush panel hollow metal doors and frames for exterior applications.
 - 1.3. Hollow Metal frames for interior windows
2. STANDARDS AND PROCEDURES
 - 2.1. Hollow metal doors and frames shall conform to the requirements of the Steel Door Institute and the Door and Hardware Institute.
 - 2.2. Hollow metal doors and frames that require a fire resistance rating shall bear a UL Label based on tests performed in accordance with ASTM E-1 52 and NFPA 252 to the degree of fire resistance indicated. Fire resistant doors, frames and windows shall comply with the requirements of NFPA 80.
3. MATERIALS
 - 3.1. Door Frames: Combination buck and jamb with integral stop, 16 gage; exterior galvanized.
 - 3.2. Doors: Flush design, 1 3/4" thick, 18 gage interior, 16 gage galvanized and insulated exterior, fire labels as required; ASTM E-152 and Steel Door Institute SDI 100.
 - 3.3. Finish: Rust inhibitor, lead-free primer over phosphate treatment with two finish coats of alkyd enamel.

SECTION 08710 — DOOR HARDWARE

1. INCLUDES hardware and gaskets not specifically supplied with the manufactured doors.
 - 1.1. Complete fire rated, non-rated and security hardware sets required for proper operation and code compliance of all flush panel metal personnel doors.

OUTLINE SPECIFICATIONS

C-0 Outfitting

2. STANDARDS AND PROCEDURES

2.1. Hardware shall conform to the requirements of the Door and Hardware Institute and NFPA requirements.

3. MATERIALS

3.1. Hardware Sets: Ball bearing and plain ball bearing hinges, mortise locksets, cylindrical latchsets, closures, coordinators and stops, including thresholds and weather-stripping on exterior doors. Low opening force closures for accessibility requirements.

3.2. Finish: BHMA 630 satin stainless; 626 satin chrome where stainless is not available and aluminum for non-ferrous parts.

3.3. Locksets: Mortise type with automatic deadlocking plunger. Furnished less cylinder cores. Lever handles and panic hardware for accessibility requirements.

3.4. Keying System: Match existing Fermilab system; Best mortise latchsets for lockable doors and cylinder latchsets for passage doors.

SECTION 08800 — GLAZING

1. INCLUDES transparent glazing compounds and accessories for interior glazing.

2. STANDARDS AND PROCEDURES

2.1. Federal Specifications:

DD-G-451 Glass, Float or Plate, Sheet, Figured (Flat for Glazing, Mirrors and Other Uses).

DD-G-1 403 Glass, Plate (Float), Sheet, Figured and Spandrel (Heat Strengthened and Fully Tempered)

TT-G-41 0 Glazing Compound, Sash (Metal) for Back Bedding and Face Glazing (Not for Channel or Stop Glazing)

TT-G-1543 Sealing Compound: Silicone Rubber Base (for Caulking, Sealing, and Glazing in Buildings and Other Structures)

2.2. Manufacture and installation of glass and glazing shall conform to the Flat Glass Marketing Association (FGMA) glazing and installation manual for installation methods, and glass shall meet the quality criteria of Federal Specification DD-G-

OUTLINE SPECIFICATIONS**C-0 Outfitting**

451. Tempered glass shall meet the quality and strength requirements of Federal Specification DD-G-1 403 and be safety glass complying with ANSI Z97.1 and Federal Standard 16 CFR 1201 with a label on each piece. Glazing materials shall be certified to be in compliance with Category I or II of 16 CFR 1201.

3. MATERIALS

- 3.1. Interior windows: Single pane ¼" thickness.
- 3.2. Door Lights: Interior, 1/4" clear safety glass at aluminum entrance doors.
- 3.3. Setting Material: Neoprene setting blocks, gaskets and pre-shimmed tape and metal stops.

OUTLINE SPECIFICATIONS

C-0 Outfitting

DIVISION 9 FINISHES

SECTION 09310 CERAMIC TILE

1. INCLUDES: Materials and installation of ceramic tile floor and base in toilet rooms.
2. STANDARDS AND PROCEDURES: Tile at Concrete Masonry Walls: ANSI A108, install per TCA Method W211, Cement Mortar, Bonded.
3. MATERIALS:
 - 3.1 Furnish only Standard Grade unglazed wall tile meeting ANSI A137.1, American Olean ceramic mosaic or equal. Supply 2" x 2" floor tile and matching cove base
 - 3.2 Glazed Wall Tile Trim to match finish size, color and shade to match field tile.

SECTION 09680 CARPETING

1. INCLUDES: Materials and installation of carpet in the office and corridor areas along with vinyl base.
2. STANDARDS AND PROCEDURES:
 - 2.1. Standards of the Carpet and Rug Institute (CRI).
3. MATERIALS:
 - 3.1 Carpeting will be to match Fermilab standard in color to be selected.

SECTION 09900 — PAINTS AND COATINGS

1. INCLUDES exterior and interior field painting of steel, concrete and masonry surfaces and field painting of electrical and mechanical equipment.
2. STANDARDS AND PROCEDURES
 - 2.1. Steel Structures Painting Council (SSPC): Painting Manual
3. MATERIALS
 - 3.1. Colors: As selected by Fermilab; Standard colors.

OUTLINE SPECIFICATIONS**C-0 Outfitting**

3.2. Coatings: Approved lead-free primers, fillers and finish coats of reputable manufacturers.

3.3. Finish Schedule: Primer and two coats on concrete; block filler and two coats on concrete masonry; primer and touch-up and two finish coats on shop primed steel; primer and two coats on unprimed and galvanized steel.

OUTLINE SPECIFICATIONS

C-0 Outfitting

DIVISION 10 SPECIALTIES

SECTION 10270 ACCESS FLOORING

1. INCLUDES: Materials and installation of computer access flooring in first and third floor computer rooms.
2. STANDARDS AND PROCEDURES: Tile at Concrete Masonry Walls: ANSI A108, install per TCA Method W211, Cement Mortar, Bonded.
 - 2.1 Design criteria - floor panels: panels to support a minimum concentrated load of 1250 lbs on a 25mm x 25mm (1 sq. in.) point anywhere on the panel, with a deflection not to exceed 2.54 mm. Panels to support a rolling load of 1000 lbs. on a 3" x 1-13/16" wheel at 10 passes, and 800 lbs. on a 6 x 1 1/2" wheel at 10,000 passes. overall surface deformation not to exceed 1 mm. ultimate load: minimum 3500 lbs. Method for testing loads shall be in accordance with the "recommended test procedures for access floors" as published by CISC
 - 2.2 Fire resistance: Panels shall be constructed with a moisture resistant, concrete core. floor panels, less finished flooring shall have a class a fire rating. Integrity of the panels and core shall not be affected by water resulting from sprinkler activation. Core shall contain no toxics such as ureaformaldehyde.
 - 2.3 Electrical resistance: from top of panel through to understructure shall not exceed 2 x 10 10 ohms nor be less than 5 x 10 5 ohms.
 - 2.4 Grounding: grounding connectors and ground wire supplied and installed by electrical trade.
3. MATERIALS:
 - 3.1 Products: Access flooring shall be "Tate Concore" or equal as distributed by Camino Modular Systems Inc.,
 - 3.2 Description of system: panels to be 24" x 24" in size made of lightweight cementitious core encased in metal. Panels shall be supported on four sides by a bolted stringer system. Factory finish all panels with 1/16" plastic laminate and integral edge trim. Panels shall be welded steel construction complete with steel top sheet. Exposed concrete panels or laminated construction is unacceptable.

OUTLINE SPECIFICATIONS**C-0 Outfitting****SECTION 10200 - LOUVERS AND VENTS**

1. INCLUDES motorized, operable and stationary louvers for ventilation that are not an integral part of mechanical equipment.
 - 1.1. Aluminum louvers in metal insulated siding framed openings for the buildings.
2. STANDARDS AND PROCEDURES
 - 2.1. Air Movement and Control Association (AMCA)
 - 2.2. American Society for Testing and Materials (ASTM) B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate. B221 Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
3. MATERIALS
 - 3.1. Extruded aluminum alloy: 6061-T6, 6063-T5 or 6063-T6.
 - 3.2. Aluminum louver units: Standard 4" deep stationary louvers, of maximum section size, all welded construction with built-in caulking slots. Frames shall have mitered corners with fully welded joints, ground smooth. Blades shall be 45-degree drainable type.
 - 3.3. Fasteners: Fasteners and accessories in contact with aluminum shall be Type 302 stainless steel or cadmium plated.
 - 3.4. Aluminum finish: Caustic etch and one hour anodizing.
 - 3.5. Bird Screens: Maximum 1/2" mesh bird screens fabricated from minimum .080" aluminum wire mounted in removable extruded aluminum frames of minimum 0.050".
 - 3.6. Blank-off plates: Interior mounted insulated blank-off panels shall consist of minimum 4" thick urethane or styrofoam insulation and faced on both sides with minimum 0.050" thick aluminum sheet and a 0.080" extruded aluminum frame.
 - 3.7. Support angles: Mounting angles for screw connecting louvers to structural

OUTLINE SPECIFICATIONS

C-0 Outfitting

steel framing shall be minimum 2 x 2 x 1/4 inch extruded aluminum

SECTION 10800 — TOILET ACCESSORIES

1. INCLUDES manufactured items for use in conjunction with toilet rooms.
 - 1.1. Grabbars
 - 1.2. Towel dispensers
 - 1.3. Towel disposal units
 - 1.4. Soap dispensers
 - 1.5. Toilet paper dispensers
 - 1.6. Sanitary napkin dispensers
 - 1.7. Coat hooks
 - 1.8. Mirrors
 - 1.9. Shelves
2. STANDARDS AND PROCEDURES:
 - 2.1 Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, wherever possible.
 - 2.2 Coordinate with Fermilab Construction Coordinator for acceptable designs and finishes.
 - 2.3 Stamped names or labels on exposed faces of units will not be permitted, except where otherwise specified.
 - 2.4 Provide locks where specified, with same keying for accessory units in project wherever possible.
3. MATERIALS
 - 3.1 Stainless Steel: AISI, Type 304, Provide No. 4 polished finish, unless otherwise specified.

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 3.2 Brass: Cast or forged quality alloy, FS WW-P-541.
- 3.3 Sheet Steel: Cold-rolled, commercial quality, ASTM A366. Surface preparation and metal pretreatment as required for applied finish.
 - 3.4 Chromium Plating: Nickel and chromium electro-deposited on metal, ASTM B456, Type SC2.
 - 3.5 Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.
 - 3.6 Galvanized Steel Mounting Devices: Hot-dip galvanized after fabrication ASTM A386.

OUTLINE SPECIFICATIONS

C-0 Outfitting

DIVISION 13 SPECIAL CONSTRUCTION

SECTION 13850 — DETECTION AND ALARM

1. INCLUDES replacing the existing fire alarm control panel with an addressable type panel. Demolish of high bay beam detectors and spot type smoke detection. Furnish and install air sampling smoke detection in the Collision Hall and Computer rooms. The fire alarm system designed to interface automatic fan shut-down and Elevator recall. The fire alarm system will also be integrated to Fermilab's site-wide FIRUS monitoring system to dispatch the on-site fire department in case of an fire alarm.

2. STANDARDS AND PROCEDURES

2.1. National Fire Protection Association (NFPA)

- A. NFPA 70, National Electrical Code, 2002 Edition.
- B. NFPA 72, National Fire Alarm Code, 2000 Edition.
- C. NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems, 1999 Edition.

2.2 ANSI and ASME

- A. ANSI 17.1 Safety Code Elevators & Escalators

3. MATERIALS

3.1. Fire Alarm Control Panel: Addressable analog type, Siemens – Building Systems (Cerberus) model MXL-IQ

3.2 Smoke Detectors: Photoelectric type

3.2. Heat Detectors: Fixed temperature and rate of rise.

3.3. Manual Pull Stations: Located at all exits and at Stairwell entrances.

3.4 Air Sampling Smoke Detection: Display unit and detector to be interfaced to fire alarm system, VESDA. Sampling tube to be CPVC listed for fire protection.

SECTION 13900 — FIRE SUPPRESSION

1. INCLUDES automatic dual action pre-action sprinkler system protecting the Collision Hall area. The remaining facility areas will be provided with a wet type

OUTLINE SPECIFICATIONS**C-0 Outfitting**

automatic sprinkler systems. The automatic sprinkler system will be connected to Fermilab's automatic continuous industrial cooling water (ICW) supply. The automatic sprinkler systems will be provided with waterflow alarm detectors and valve supervision, interfaced to the fire alarm system.

2. STANDARDS AND PROCEDURES

2.1. American Society for Testing and Materials (ASTM)

2.2. National Fire Protection Association (NFPA)

A. NFPA 13, Standard for Automatic Sprinkler Systems, 1999 Edition.

3. MATERIALS

3.1. Carbon steel piping, ASTM A795; 2" and under: Schedule 40; 2 1/2" and larger: Schedule 40.

3.2. Valves: *Iron* body, wedge disc OS&Y gate with bronze trim; Wafer check valves: 2 1/2" brass hose valves.

3.3 Pre-action valve assembly including trim devices and releasing panel, Viking Fire Protection.

3.3. Sprinkler Heads: 1/2" orifice brass finish pendent type head, quick response, Viking Fire Protection.

3.4. Fittings: 2" and under: Duct-iron threaded; 2 1/2" and larger: Victaulic style grooved couplings.

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 14 CONVEYANCE****SECTION 14210 — ELEVATORS**

1. INCLUDES 5000 lb. Hospital type service elevator, including car, entrances, controls, safety equipment, hoistway equipment, and elevator machinery.
2. STANDARDS AND PROCEDURES
 - 2.1. American National Standards Institute (ANSI) Standards for Elevators, Dumbwaiters and Escalators
3. MATERIALS
 - 3.1. Capacity and Travel: 5000 lb., 49 feet travel.
 - 3.2. Type and Speed: 80 FPM

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 15 MECHANICAL****SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS**

1. INCLUDES basic information about products and activities related to building service piping, process piping, fire protection piping, hangers and supports, mechanical identification, plumbing fixtures and equipment, heat generation, refrigeration, heating, ventilating, air conditioning, mechanical insulation of pipes, ductwork, and mechanical equipment, HVAC instrumentation and control, testing adjusting and balancing.

SECTION 15080 — MECHANICAL INSULATION

1. INCLUDES insulation for supply ductwork, plumbing, refrigerant piping, hydronic equipment and chilled water piping systems. Ductwork insulation shall extend from discharge of air handling units to the common wall of the room being air-conditioned. Piping insulation shall include all chilled water supply and return piping, refrigeration piping including control valves and accessories, and equipment.

2. STANDARDS AND PROCEDURES

2.1. American Society for Testing and Materials (ASTM)

2.2. American National Standards Institute (ANSI)

2.3. Building Officials and Code Administrators (BOCA)

2.4. American Society of Heating, Air Conditioning and Refrigeration Engineers (ASHRAE)

3. MATERIALS

3.1. Ductwork: 1 1/2", minimum, rigid fiberglass insulation conforming to ASTM C 612. Joints and seams shall be foil taped.

3.2. Pipe: Pipe size 1" and below: 1/2" thickness; Pipe size 1 1/4" and above: 1" thickness. Insulation shall be molded sections of fiberglass pipe insulation; factory applied "ASJ" all -service vapor barrier jacket.

3.3. Pipe Fittings, Valves and Accessories: Fiberglass blanket insulation

OUTLINE SPECIFICATIONS**C-0 Outfitting**

wrapped to match thickness of molded sections and covered with white molded PVC jacket covers.

SECTION 15100 — BUILDING SERVICES PIPING

1. INCLUDES piping systems with pipe, valves, piping specialties and other components for building services.
 - 1.1. Building
 - 1.1.1. Domestic water (DWS)
 - 1.2.2. Sanitary Drain, Waste, Vent (DWV)
2. STANDARDS AND PROCEDURES
 - 1.1. American Society for Testing and Materials (ASTM)
 - 1.2. American National Standards Institute (ANSI)
 - 1.3. Building Officials and Code Administrators (BOCA)
 - 1.4. American Society of Heating, Air Conditioning and Refrigeration Engineers (ASH RAE)
3. MATERIALS
 - 3.1. Interior Domestic Water System:
 - 3.1.1. Installation of water supply system to the water closets, lavatories, sink, water heater & humidifier in the Building.
 - 3.2.2. Materials: 1/2" and larger: Hard drawn copper tubing; 1/2" and less: Soft tubing.
 - 3.2.3. Fittings: 1/2" and larger: Sweat type lead free solder; less than 1/2": Compression couplings.
 - 3.3. Sanitary Drainage System:
 - 3.3.1. Installation of drain, sanitary, waste and vent piping in the Building.
 - 3.3.2. Materials: Underslab: Cast iron cement lined and asphaltic coated AWWA C-157 standard weight hub and spigot; Above grade: PVC drainage pipe, Schedule 80; PVC vent piping.

OUTLINE SPECIFICATIONS**C-0 Outfitting****SECTION 15200 — PROCESS PIPING & ACCESSORIES**

1. INCLUDES piping systems and piping specialties such as valves, suction diffusers, expansion tank, etc devoted to process liquids.
 - 1.1. Glycol Chilled water supply and return
 - 1.2 Electronics Chilled water supply and return headers only
2. STANDARDS AND PROCEDURES
 - 2.1. American Society for testing and Materials (ASTM)
 - 2.2. American National Standards Institute (ANSI)
3. MATERIALS
 - 3.1. Chilled Water piping: Carbon steel, schedule 40.
 - 3.1 Electronics chilled water piping: copper

SECTION 15300 — FIRE PROTECTION PIPING**SECTION 15400 — PLUMBING FIXTURES AND EQUIPMENT**

1. INCLUDES sinks, lavatories, water closets, flush-valve toilets, mop basin, water heaters and other building plumbing fixtures and equipment.
2. STANDARDS AND PROCEDURES
3. MATERIALS
 - 3.1. Water Closets: Wall hung, handicap style, vitreous china, carrier mount, flush valve and seat.
 - 3.2. Lavatory: Wall hung, vitreous china, single bowl.
 - 3.3. Water Heater: Electric, glass lined, quick recovery.
 - 3.4. Mop Basin:
 - 3.5. Counter Sink:

OUTLINE SPECIFICATIONS**C-0 Outfitting****SECTION 15600 — REFRIGERATION EQUIPMENT**

1. INCLUDES circulating pumps for process cooling systems, computer room airconditioning system, condensing unit
 - 1.1. Circulating pumps will be provided in the primary cooling systems to circulate glycol chilled water.
 - 1.2. Computer room airconditioning unit system shall be downflow, direct expansion R-22 unit complete with its own controls and outdoor condensing unit.
2. STANDARDS AND PROCEDURES
 - 2.1. American Society of Mechanical Engineers (ASME)
3. MATERIALS
 - 3.1. Circulating Pumps: vertical cast iron pumps with bronze impellers.
 - 3.2. Computer Airconditioning Unit: Commercially available precision environmental control system designed to maintained temperature and humidity in rooms containing critical electronics equipment and racks. Fan shall be centrifugal type statically and dynamical balanced. Unit shall have a built in humidifier, reheat, control processor. Unit shall have dual refrigeration circuit and corresponding outdoor condensing unit.

SECTION 15700 -HEATING, VENTILATING, AND AIR CONDITIONING EQUIPMENT

1. INCLUDES equipment components of HVAC systems, air handling units, make-up air unit, exhaust fans, louvers, motorized dampers, duct smoke detectors, fancoil unit, terminal heat transfer units and associated controls.
 - 1.1. Air handling units with cooling coils, heater, dampers, and controls
 - 1.2. baseboard heaters
 - 1.3. Make Up air Unit

OUTLINE SPECIFICATIONS

C-0 Outfitting

1.4 Fancoil Unit

2. STANDARDS AND PROCEDURES

2.1. Air Movement and Control Association (AMCA)

2.2. Airconditioning and Refrigeration Institute (ARI)

3. MATERIALS

3.1. Air Handling Units: Fan section with belt driven centrifugal fan with guards, V-belt adjustable drives, mixing box section with dampers, chilled water cooling coil section, electric heating coil section, humidifier, filter section and access sections, as required.

3.1.1. Dampers: Motor operated, interlocked with ventilation unit.

3.1.2. Controls: Controls shall be compatible with sitewide hvac building automation system for control and monitoring.

3.2. Baseboard Heaters:

3.2.1. Electric baseboard heaters in areas in the building where no ductwork is provided for the HVAC systems.

3.2.2. Controls: Wall mounted thermostats.

3.3 Make Up air Unit: Fan section with belt driven centrifugal fan with guards, V-belt adjustable drives, mixing box section with dampers, chilled water cooling coil section, electric heating coil section, humidifier, filter section and access sections.

3.3 FanCoil Unit: Horizontal Coil-Blower unit with standard controls and stainless steel double slope drain pan

SECTION 15800 — AIR DISTRIBUTION

1. INCLUDES air distribution fans, purge/return fan, ductwork and accessories, and air inlets and outlets.

1.1. Purge/return fans. Equipment shall include the fan, weatherproof fan housing, and fan motor.

1.2. Return/Purge fans.

1.3. Ductwork and Accessories

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 1.3.1. Ductwork.
 - 1.3.2. Fire and smoke dampers in fire partition walls.
- 2. STANDARDS AND PROCEDURES
 - 2.1. American Society for Testing and Materials (ASTM)
 - 2.2. SMACNA Duct Construction Manual
 - 2.3. National Fire Protection Association (NFPA)
 - 2.4. American Movement and Control Association (AMCA)
- 3. MATERIALS
 - 3.1. Return/Purge Fans:
 - 3.1.1. Reinforced flanged steel housing.
 - 3.1.2. Cast aluminum airfoil blades.
 - 3.1.3. Direct drive motor.
 - 3.2. Ductwork: Galvanized steel, SMACNA Duct Construction Manual.
 - 3.3. Registers and Grilles: Factory fabricated steel or aluminum.

OUTLINE SPECIFICATIONS**C-0 Outfitting****DIVISION 16 ELECTRICAL****SECTION 16050 — BASIC ELECTRICAL MATERIALS AND METHODS**

1. INCLUDES basic information about products and activities related to wiring, electrical power, low voltage distribution, lighting, grounding, identification and tagging, quality assurance, equipment and material protection, handling and storage of electrical equipment/material, preparation and testing of equipment/material, touch-up painting and calibration.

2. STANDARDS AND PROCEDURES

- 2.1. American National Standards Institute (ANSI)
- 2.2. Insulated Cable Engineers Association (ICEA)
- 2.3. Institute of Electrical and Electronics Engineers (IEEE)
- 2.4. National Electrical Manufacturers Association (NEMA)
- 2.5. National Electrical Testing Association (NETA)
- 2.6. National Fire Protection Association (NFPA)
- 2.7. Occupational Safety and Health Administration (OSHA)
- 2.8. Underwriters' Laboratories, Inc. (UL)

SECTION 16100—WIRING METHODS

1. INCLUDES conduit (except concrete encased) and raceways, low voltage single conductor cable, pullboxes, enclosures, switches, receptacles and terminations.

2. STANDARDS AND PROCEDURES

- 2.1. American National Standards Institute (ANSI)
- 2.2. Insulated Cable Engineers Association (ICEA)
- 2.3. Institute of Electrical and Electronics Engineers (IEEE)
- 2.4. National Electrical Manufacturers Association (NEMA)

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 2.5. National Electrical Testing Association (NETA)
- 2.6. National Fire Protection Association (NFPA)
- 2.7. Occupational Safety and Health Administration (OSHA)
- 2.8. Underwriters' Laboratories, Inc. (UL)

3. MATERIALS

3.1. Conduits: Describes the requirements for installation of conduit, fittings, number of permitted conduit bends, types of conduit radius', conduit threading, conduit support and conduit routing.

3.2. Raceways: Rigid galvanized steel conduit: Hot dipped galvanized with zinc or enamel coating. Conforms to ANSI C80.1 for rigid galvanized steel and ANSI G80.6 for intermediate metal conduit (1MG).

3.2.1. Concrete encased conduit: Type EB PVC. Direct buried: Rigid galvanized steel.

3.2.2. Surface mount: Intermediate metal conduit (service buildings); Rigid aluminum conduit (enclosures and shafts).

3.3. Flexible Conduit: Required for final connections to motors, floor or wall mounted transformers or other vibration generating devices. Maximum length to not exceed 36".

3.4. Liquid Tight Flexible Conduit: Flexible galvanized steel core with an oil resistant, PVC jacket.

3.5. Low Voltage Single Conductor Cable

3.5.1. Wire: Soft drawn copper

3.5.2. Size: #12 AWG, minimum, stranded.

3.5.3. Insulation: Type THHN, 600 V.

SECTION 16200 — ELECTRICAL POWER

- 1. INCLUDES basic power system products, including emergency generators, 15 kV disconnect switches, oil filled pad-mount transformers, 15 kV cable and power monitoring devices.

2. STANDARDS AND PROCEDURES

- 2.1. American National Standards Institute (ANSI)

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 2.2. American Society for Testing and Materials (ASTM)
- 2.3. Association of Edison Illuminating Companies (AEIC)
- 2.4. Insulated Cable Engineers Association (ICEA)
- 2.5. Institute of Electrical and Electronics Engineers (IEEE)
- 2.6. National Electrical Manufacturers Association (NEMA)
- 2.7. National Fire Protection Association (NFPA)
- 2.8. Underwriters' Laboratories, Inc. (UL)
- 2.9. The Wire Association International "Electrical Wire Handbook".
3. MATERIALS
 - 3.1. Emergency Generators:
 - 3.1.1. Ratings:
 - 3.1.1.1. Building: 250 kW.
 - 3.1.2. Fuel Type:
 - 3.1.2.1. Building: Diesel.
 - 3.1.3. Output Ratings: 480/277 V, 4-wire wye connected secondary, 3-phase, 60 hertz, solid ground.
 - 3.1.4. Function: To provide electrical power for emergency egress systems from the building areas in the event of a normal power failure. Systems to be powered from the emergency electrical system include: Emergency lighting, exit signs, fire detection systems and elevators. Also provides power to Collision Hall ventilation to maintain ODH 0 rating.
 - 3.2. 15 kV Disconnect Switches (Furnished by Fermilab):
 - 3.2.1. Ratings: 15 kV, 600 A, 450 MVA interrupting capacity.
 - 3.2.2. Function: Four-way, manually operated, quick-make, quick-break for feeder and load isolation.
 - 3.2.3. Installation: Free standing, outdoor mounting, bottom entry.
 - 3.3. 1500 kVA Oil-Filled Transformers (Furnished by Fermilab):
 - 3.3.1. Ratings: 1500/1680 kVA, OA, 13.8 kV, 3-wire delta connected primary, 480/277 V, 4-wire wye /connected secondary, 3-phase, 60 hertz, solid ground.

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 3.3.2. Type: Oil filled, pad mount.
- 3.3.3. Taps: 2-½% above and 2-½% below

- 3.4. 500 kVA Transformers (Furnished by Fermilab):
 - 3.4.1. Ratings: 500/560 kVA, CA, 13.8 kV, 3-wire delta connected primary, 480/277V, 4-wire wye connected secondary, 3-phase, 60 hertz, solid ground.
 - 3.4.2. Type: Oil filled, pad mount
 - 3.4.3. Taps: 2-½% above and 2-½% below

- 3.5. 15 kV Cable
 - 3.5.1. Construction:
 - 3.5.1.1. 750 MCM, 15 fry, aluminum, ethylene propylene (EPR) insulation, 1/3 concentric neutral, overall jacket, triplexed construction (furnished by Fermilab).
 - 3.5.1.2. #1/0 AWG, 15 kV, aluminum, ethylene propylene (EPR) insulation, 1/3 concentric neutral, overall jacket, triplexed construction. Cable runs from 15 kV, 4-way switches to transformers.

SECTION 16400 — LOW VOLTAGE DISTRIBUTION

- 1. INCLUDES switchboards, panelboards, motor control centers, dry type transformers and transfer switches.
 - 1.1. Switchboards:
 - 1.1.1. 1- for conventional power, 1- for user computer power, 1- for power supplies.
 - 1.2. Panelboards: To be provided as required and as shown on the single line diagrams.
 - 1.3. Motor Control Centers:
 - 1.4. Dry Type Transformers: To be provided as required and as shown on the single line diagrams.
 - 1.5. Transfer Switches (To switch to emergency power source):
- 2. STANDARDS AND PROCEDURES

OUTLINE SPECIFICATIONS

C-0 Outfitting

- 2.1. American National Standards Institute (ANSI)
- 2.2. American Society for Testing and Materials (ASTM)
- 2.3. Association of Edison Illuminating Companies (AEIC)
- 2.4. Insulated Cable Engineers Association (ICEA)
- 2.5. Institute of Electrical and Electronics Engineers (IEEE)
- 2.6. National Electrical Manufacturers Association (NEMA)
- 2.7. National Fire Protection Association (NFPA)
- 2.8. Underwriters' Laboratories, Inc. (UL)
- 2.9. The Wire Association International "Electrical Wire Handbook".
3. MATERIALS
 - 3.1. Switchboards:
 - 3.1.1. Ratings: 2000 A, 480/277 V, 3-phase, 4-wire, 60 hertz, 35-kA minimum interrupting capacity.
 - 3.1.2. Feeder Breakers: Molded case, bolt on type.
 - 3.1.3. Construction: Switchboard, Class II, indoor.
 - 3.2. Panelboards:
 - 3.2.1. Ratings: 1200 A, 800 A, 600 A, 400 A, 225 A, or 100 A (as required), 480/277 V, 3-phase, 4-wire, 60 hertz, 35 kA minimum interrupting capacity.
 - 3.2.2. Features: Flush doors, locks, screw terminals, NEMA PB-1, WP-115a, UL 67, and UL 50.
 - 3.2.3. Locks: All breakers suitable for padlocks.
 - 3.3. Motor Starters:
 - 3.3.1. Type: Full voltage, non-reversing combination type with motor circuit protector.
 - 3.3.2. Features: 120 V Control power transformer, red and green indicating lights, HOA selector switch, 1 N.O. and 1 N.C. auxiliary contact.
 - 3.4. Dry Type Transformers:
 - 3.4.1. Ratings: 480 V, 3-phase, 60 hertz, primary; 120/208 V 3-phase, 4-wire secondary.

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 3.4.2. Taps: 2-½% above and 2-½% below.
- 3.4.3. “K” rated transformers shall be provided for neutral harmonic heat dissipation (K-13 minimum).
- 3.4.4. Construction: Class H Insulation, indoor enclosure, suitable for floor or wall mounting with drip shield.
- 3.5. Transfer Switches:
 - 3.5.1. Ratings: 480/277 V, 3-phase, 4-wire (4-pole), 35 kA minimum withstand capacity.
 - 3.5.2. Automatic return to normal source upon restoration of normal power source.
 - 3.5.3. Automatic start of generator for weekly start-up and testing.
- 3.6. Power Monitors:
 - 3.6.1. Provided to monitor incoming power at all locations.

SECTION 16500 — LIGHTING

- 1. INCLUDES lighting equipment, lighting accessories, interior lighting, exterior lighting and emergency lighting, including emergency lights and exit signs.
 - 1.1. Building High Bay Areas: High intensity discharge, aluminum reflector and integral ballast.
 - 1.2. Electrical/Mechanical Rooms: Surface mounted, 96” or 48” fluorescent with 2 lamps.
 - 1.3. Beam Enclosures: Surface mounted, 96” or 48” fluorescent with 2 lamps
 - 1.4. Stairways: *Surface* mounted, 96” or 48” fluorescent with 2 lamps
 - 1.5. Aisles: Surface mounted, 96” or 48” fluorescent with 2 lamps
 - 1.6. Exit: LED type.
 - 1.7. Exterior: Mercury vapor, aluminum housing, photocell operation.
- 2. STANDARDS AND PROCEDURES
 - 2.1. Institute of Electrical and Electronics Engineers (IEEE)

OUTLINE SPECIFICATIONS**C-0 Outfitting**

- 2.2. National Electrical Manufacturers Association (NEMA)
- 2.3. National Fire Protection Association (NFPA)
- 2.4. Underwriters' Laboratories, Inc. (UL)
- 2.5. Code of Federal Regulations (10 CFR 435)

3. LIGHTING LEVELS

- 3.1. Building:
 - 3.1.1. Staging Area: 50 foot-candles.
 - 3.1.2. Electrical / Mechanical Room: 75 foot-candles.
 - 3.1.3. Stairs: 20 foot-candles.
 - 3.2.4. Toilet Rooms: 30 foot-candles.
 - 3.2.5. Office / Tech Areas – 50 foot-candles
 - 3.2.6. Computer Rooms – 50 foot candles

This appendix contains:

- Integrated Project Team Responsibility Matrix
- WBS 1.10, 2.0 and 3.0 WORK SCOPE INTERFACE MOU
- Fermilab Environmental Evaluation Form
- LEED Project Checklist
- Recommended Milestones for Solicitation
- Whitestone Building and Repair Cost Reference Information
- Stakeholder Input from Comment and Compliance Review

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Director	Project Manager	WBS 1.10 Level 2 Manager	WBS 3.0 Level 2 Manager	Directorate	Div/ Sect Head		Business Services				FESS			ES&H			
							Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety	Security		
Preliminary Design																		
set up Engineering task	define project					assess resource availability					define project							indicates that action is required
		approve Engineering task			review Engineering task					review Engineering task	submit Engineering task							indicates approval action required
		establish T2 performance baseline with PE									establish T2 performance baseline with PM							List of Acronyms
						establish budget code				identify available resources	coordinates engineering resources, selection, tasking							
select & task A/E							issue A/E RFP				draft A/E RFP							
				approve selection			establish contract w/ A/E	assist w/ contracting		approve selection	review proposals, select A/E							
		approve tasking					establish task w/ A/E			approve tasking	initiate task requisition							A/E architectural / structural consultant
prepare CDR			coordinate customer team document requirements		provide aesthetic input	provide resources as required				provide resources as required	directs design effort							
			monitor design efforts								interface w/ customer							
CDR approval	approve CDR	approve CDR		approve CDR	approve CDR	approve CDR				approve CDR	submit for approval							ICE independent cost estimate
prepare NEPA documentation	submit PIF to ES&H									interface with ES&H	draft PIF			review PIF				PIF project information form (NEPA)
														submit recommendation to DOE				
lab-wide review	review & comment	review & comment	review & comment	approve for release			review & comment	review & comment		review & comment	coordinates CDR review, comment resolution			review & comment	review & comment	review & comment		PO purchase order
submit package to Directorate	participate in director review		participate in director review	participate in director review	organize director review	participate in director review	participate in director review			participate in director review	participate in director review							PRF project request form
					aesthetic approval													QA quality assurance
					approve project submission													RFI request for information
submit package for Construction Directive Authorization					submit Construction Directive Authorization													
establish funding	request work package				create work package (Budget office)													
cost tracking & control		receive design progress and costs reports		monitor design progress and costs					provide timely cost data to PM	track/invoice FESS Engineering costs	track/project engineering costs							
				approve A/E invoices			approve A/E invoices			approve A/E invoices	review/approve A/E invoices							
project filing				monitor filing						monitor filing	maintain project files							
Final Design																		
select & task A/E	approve selection						issue RFP				draft A/E RFP							
							establish contract w/ A/E	assist w/ contracting		approve selection	review proposals, select A/E							
	approve tasking						establish task w/ A/E (PO)			approve tasking	initiate task requisition							
direction of A/E	approve change orders					approve change orders	issue change orders			approve change orders	interface w/ customer & Lab organizations							
											lead development of construction documents, drawings, exhibits							
cost tracking & control	monitor design progress & costs								provide timely cost data to PM	track/invoice FESS Engineering costs	track/project engineering costs							
	approve A/E invoices						approve A/E invoices		pay invoices	approve A/E invoices	review / approve A/E invoices							
change control for design		requirements change control																
	approve changes to design performance baseline										submit changes to dsign performance baseline to PM							
assign Construction Manager	approve assignment									assign construction manager								
design coordination meetings											coordinate and lead meetings							
source evaluation		Approve SET Recommendation					participate in SET	provide counsel as requested		participate in SET	participate in SET	chair SET						
Exhibit A&B							assist in writing Exhibit A	provide counsel as requested			coordinate writing of Exhibit A&B	assist in writing Exhibit A						
lab-wide design review				approve for release			review & comment	review & comment		review & comment	coordinates review, comment resolution	review & comment		review & comment	review & comment	review & comment		
cost tracking & control	monitor design progress										coordinate engineering resources, selection, tasking, invoices							
	monitor project costs																	

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Director	Project Manager	WBS 1.10 Level 2 Manager	WBS 3.0 Level 2 Manager	Directorate	Div/ Sect Head		Business Services				FESS			ES&H			
							Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety	Security		
	approve A/E invoices						approve A/E invoices		pay invoices	approve A/E invoices	review / approve A/E invoices	establish CCB for T3						
value engineering (tailored)	participate in value engineering									participate in value engineering	coordinate & conduct value engineering	participate in value engineering						
Title II estimate & schedule	review T2 construction estimate & schedule									review T2 construction estimate & schedule	lead development of T2 construction schedule and estimate							
ICE schedule & estimate	review ICE for cost & schedule									review ICE for cost & schedule		develop ICE for cost & schedule						
design sign-off	sign-off									sign off	sign off	sign off						
develop RFP	review RFP documents						develop RFP documents				review RFP documents	review RFP documents						
assemble proposal documents							assemble proposal documents				assemble drawings, specs, Exhibit A							
regulatory permits	monitor permitting process							provide counsel as requested		identify required permits	identify required permits	monitor permitting process		identify required permits				
										provide permit information	provide permit information			prepare permit application				
	approve permit submittal									approve permit submittal				submit application to DOE				
performance baseline for construction	reconcile T2 & ICE schedule & estimate										reconcile T2 & ICE schedule & estimate	reconcile T2 & ICE schedule & estimate						
	establish T3 performance baseline with CM											establish T3 performance baseline with PM						
update PEP/AP	update PEP/AP											assist update PEP/AP						
project reporting	periodic updates to Lab management										provide input for periodic updates to Lab management	provide input for periodic updates to Lab management						
	quarterly reports to DOE										provide input for quarterly reports to DOE	provide input for quarterly reports to DOE						
directive mods	prepare requests for directive mods, submit to D/S				review & approve requests, submit to DOE	review & approve requests, submit to Directorate						assist preparation of directive mods						
project filing	monitor filing						maintain project files			monitor filing	maintain project files							
Procurement CD-3																		
issue RFP							issue RFP					initiate construction requisition						
pre-proposal meeting	participate in pre-proposal meeting						coordinate & chair pre-proposal meeting				participate in pre-proposal meeting	participate in pre-proposal meeting			participate in pre-proposal meeting			
requests for information							issue replys to RFIs				prepare replys to RFIs	review & approve replys to RFIs						
ammendments	review & approve ammendment packages						issue ammendments			review & approve ammendment packages	assemble ammendment packages	review & approve ammendment packages						
proposal evaluations	participate in SET						participate in SET	provide counsel as requested		participate in SET	participate in SET	chair SET			evaluate safety submittals			
							review proposals for business related issues					evaluate corporate quality control plan						
												evaluate schedule submittal						
												forward recommendation to source selection officer						
negotiations	approve negotiation						assist in negotiations	provide counsel as requested				conduct negotiations						
subcontract award												initiate requisition for proposal						
	approve award						award subcontract	provide counsel as requested				approve award		review /accept safety documentation				
update performance baseline for construction	chair CCB									participate in CCB		participate in CCB						
	incorporate approved changes																	
project filing	monitor filing						maintain project files			monitor filing	maintain project files	maintain project files						
Construction																		
pre-construction meeting	participate in pre-construction meeting						coordinate & chair pre-construction meeting					participate in pre-construction meeting	participate in pre-construction meeting	participate in pre-construction meeting	participate in pre-construction meeting	participate in pre-construction meeting		
ES&H Plan												review plan	review plan		review / accept plan			
project quality control plan												review/ authorize plan	review / accept plan					
SESC plan											review plan	review/ authorize plan	review / accept plan					
hazard analysis review / acceptance												review/ authorize plan	review / accept		assist review as requested			
Fermilab permits												monitor process and currency	obtain and maintain currency	oversight of process				

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Director	Project Manager	WBS 1.10 Level 2 Manager	WBS 3.0 Level 2 Manager	Directorate	Div/ Sect Head		Business Services				FESS			ES&H			
							Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety	Security		
Notice To Proceed							issue NTP					approve NTP	assure precursors are in place					
cost loaded schedule review / acceptance	review & comment											review / accept	review & comment					
submittal list review												review	review / accept					
oversight / direction of A/E		approve change orders					issue change orders			approve change orders	initiate change orders & reqs	approve change orders						
							contract oversight - funding / currency			monitor A/E performance	tasking / direction of A/E effort	monitor A/E performance						
daily inspections / reports										safety support as requested		monitor QA program	daily QA inspections for technical & safety program compliance		safety support as requested			
	monitor progress, trends									monitor progress, trends		issue daily construction report to PM, PE, FESS mgmt	daily construction report to CM					
ES&H inspections / reports	monitor safety program	monitor safety program		monitor safety program								monitor safety program		periodic walkthroughs	periodic walkthroughs			
manhour reports							review DB payroll submittals						obtain manhour reports from subcontractor					
deficiency log												monitor deficiency log	maintain deficiency log					
shop drawing review											coordinate shop drawing reviews	monitor shop drawing status	participate in shop drawing reviews					
											issue actions	approve actions						
											maintain shop drawing log							
engineering change proposals		review / approve		review / approve			issue request to sub			review / approve	initiate request	approve request						
revisions		review / approve		review / approve			issue revision to sub			review / approve	coordinate documents	approve revision						
engineering change requests		review / approve		review / approve			issue change to sub			review / approve	initiate change w/ req	approve change						
claim review / negotiations		assist review / negotiations					assist review / negotiation	provide counsel as requested		assist review	assist review	lead review / negotiation	assist review					
		approve settlements					issue related correspondence											
supplemental agreements							issue supplemental agreements					approve supplemental agreements						
non-compliance memos		monitor non-compliance memos					provide counsel as requested	provide counsel as requested			monitor non-compliance memos	issue non-compliance memos	draft non-compliance memos					
weekly construction meeting							attend as requested				attend as requested	chair meetings	attend as requested		attend as requested			
weekly project team meeting	participate in meetings			participate in meetings			participate in meetings			participate in meetings	participate in meetings	chair meetings	participate in meetings		participate in meetings			
PMG meetings	participate in meetings			participate in meetings	participate in meetings	participate in meetings	participate in meetings			participate in meetings	participate in meetings	lead presentation	participate in meetings		participate in meetings			
quarterly DOE reports	approve / submit reports											draft reports						
cost tracking & control	monitor construction progress								provide timely cost data to CM, PM	track/invoice FESS Engineering costs	track/project engineering costs	monitor construction progress	effort & progress reporting					
	monitor project costs																	
subcontractor progress updates	review & comment on schedule update submittals						review & comment on schedule update submittals			monitor update process		conduct progress updates w/ subcontractor	review & comment on schedule update submittals					
invoice approvals (sub & A/E)	approve invoices						approve invoices			approve invoices	review/approve A/E invoices	review/approve A/E & Subcontractor invoices	assure invoice checklist is complete					
punch list													review & comment on subcontractors punchlist					
	coordinate customer walkthroughs						monitor punchlist activity			monitor punchlist activity	coordinate Engineering portion of walkthroughs		coordinate punchlist walkthroughs					
												transmit punchlist to subcontractor	assemble Lab punchlist					
													monitor completion of punchlist items					
beneficial occupancy				coordinate customer div/sect responsibilities									coordinate walkthroughs					
		approve B.O.					approve B.O.			approve B.O.		transmit B.O. to subcontractor	initiate B.O. Form					
final acceptance		approve final acceptance					approve final acceptance			approve final acceptance		transmit final acceptance to subcontractor	initiate final acceptance form					
update PEP/AP				update PEP/AP								assist update PEP/AP						
incident investigations													initiate call tree					
													obtain report form subcontractor	monitor process	monitor process	monitor process		

INTEGRATED PROJECT TEAM
RESPONSIBILITY MATRIX

Phase of Work	Project Director	Project Manager	WBS 1.10 Level 2 Manager	WBS 3.0 Level 2 Manager	Directorate	Div/ Sect Head		Business Services				FESS			ES&H			
							Procurement	Legal	Accounting	FESS Management (1)	Project Engineer	Construction Manager	Construction Coordinator	Environment	Health & Safety	Security		
	monitor response to incident									assist as required		issue incident report	prepare report for CM	assist as requested	assist as requested	assist as requested		
lessons learned										develop lessons learned			assist as requested					
ES&H compliance	monitor safety compliance						monitor safety compliance			assist on technical issues		interface w/ subcontractor on issues	attend safety meetings		assist on technical issues as requested			
										monitor safety compliance		monitor safety compliance	assure subcontractor compliance		monitor safety compliance for PM			
environmental compliance	monitor environmental compliance						monitor environmental compliance			assist on technical issues		interface w/ subcontractor on issues	assure subcontractor compliance	assist on technical issues as requested				
										monitor environmental compliance		monitor environmental compliance		monitor environmental compliance for PM				
as-builts													assure as-builts kept current / accurate					
change control for construction	requirements change control																	
	approve changes to construction baseline											submit changes to construction baseline						
directive mods	prepare requests for directive mods, submit to D/S					review & approve requests, submit to DOE	review & approve requests, submit to Directorate											
project filing	monitor filing						maintain project files			monitor filing	maintain project files	maintain project files						
Close-out CD-4																		
subcontractor performance reviews													submit personal review to FESS mgmt.					
	participate in review						coordinate & lead review			participate in review		participate in review	participate in review		participate in review			
final payment/release retention	approve invoices						approve invoices			approve invoices		review/approve Subcontractor invoices	assure invoice checklist is complete					
							move open items to warrantee						move open items to warranty					
level1 budget close	assure all commitments in place											assure all commitments in place						
	request budget close					activate level 1 budget close	approve budget close											
notice of project closout	submit request						approve closeout											
final budget close						activate final budget close												
final directive	prepare request for directive mods, submit to D/S					review & approve request, submit to DOE	review & approve request, submit to Directorate					assist preparation of directive mods						
project filing	monitor filing						maintain project files			monitor filing	maintain project files	maintain project files						



Fermilab

October 28, 2004

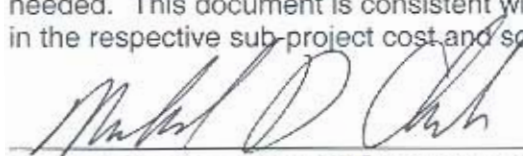
TO: Michael Lindgren, BTeV Project Manager

FROM: Michael Church, BTeV WBS 2.0 Level 2 Manager
Joseph Howell, BTeV WBS 1.10 Level 2 Manager
Thomas Lackowski, BTeV WBS 3.0 Level 2 Manager

SUBJECT: WBS 1.10, 2.0 and 3.0 WORK SCOPE INTERFACE MOU
BTeV
FESS/Engineering Project No. 6-8-3

The memo and the attached spreadsheet, entitled, Index: "Boundaries / Division of responsibilities" and "Source of Requirements" provide a Memorandum of Understanding, as of this date, for the division of work scope, and interface for elements of work common to the three subject subprojects.


This document is intended to be a living document and will be revisited and revised as needed. This document is consistent with the scope of work, costs and schedules presented in the respective sub-project cost and schedule documents.

 10/28/04

Michael Church, BTeV WBS 2.0 Level 2 Manager date

 10/28/04

Joseph Howell, BTeV WBS 1.10 Level 2 Manager date

 10/28/04

Thomas Lackowski, BTeV WBS 3.0 Level 2 Manager date

cc: Project File (6-8-3)
Chrono File
BTeV document database

INDEX: "BOUNDARIES / DIVISION OF RESPONSIBILITIES" and "SOURCE OF REQUIREMENTS"

[Requirement Source in brackets]

Item #	Description	WBS 3.0 Responsibility	WBS 1.10 Responsibility	WBS 2.0 Responsibility
POWER				
1	Power-Collision Hall	up to and including indoor transformer [1,2,3, 10]	Power distribution from transformer to & including panel to racks and detectors	None
2	Power - Assembly Hall	up to & including panel breakers [1,2,3, 10]	Power distribution from panel to Power supplies	None
3	Power - Building	Complete all conventional [1,2,3, 10]	Power distribution for WBS 1.1 installed systems from panels [10]	None
4	Power - Counting Room	up to Power Panel including indoor transformers [1,2,3]	Power distribution from panels to racks	None
5	Power - Building Equip (lighting, hvac equip, fire system, crane, elevator)	Complete [1,2,3]	interface on monitoring [10]	None
6	CO-service Building Power	Outdoor Transformer to indoor switchboard. BUS Duct & structural supports [2, 10]	None	Bus from C0 service building to tunnel penetrations. [6-2.0] Power distribution to equip [10]
7	Backup power generator for C0 Assembly Hall	Complete [1,2,3]	None	None
8	Cable Trays in Collision and Assembly Hall	None	Complete [10]	None
9	B4 C1 service Bldg Power	up to indoor power panel[3]	None	Distribution to equipment [10]
10	Collision hall ground plane	None	Complete	None
11	Counting room ground plane	Complete [1,2,3]		None
FIRE PROTECTION				
12	Fire Protection System (sprinkler etc)	Complete [5,2]	None	None
13	Fire detection system	Room monitors in Collision, Assembly hall and Counting Rooms [5,2]	Smoke detection as part of Rack Protection	None

Item #	Description	WBS 3.0 Responsibility	WBS 1.10 Responsibility	WBS 2.0 Responsibility
COOLING				
14	LCW	None [2, 8]	Connections including bus from header to Magnets and PS	Headers along walls to Collision and Assembly Halls [14-2.0]
15	Chilled Water	Complete including headers from Mechanical Room into and along far wall of Collision Hall & fancoils at collision hall [2,3,4]	Connection to ECW system [10]	None
16	Third floor counting room cooling	Complete [2,3,4]	None	None
17	First floor and collision hall rack cooling	Chilled water headers only for electronics cooling water system (ECW). Headers only under 1st floor of counting room. Taps and valves <u>not</u> included. [2,3,4]	Electronics cooling water system and distribution manifolds	None
18	HVAC Building	Complete [5]	None	None
19	HVAC Assembly Hall	Complete [4,5,6,7]	Control interface (ODH, Slow Controls)	None
20	HVAC Collision Hall	Complete [4,5,6,7]	Control interface (ODH, Slow Controls)	None
21	CO-service Building HVAC mods, &,building Mods.	Complete [8]	None	None
MISC				
22	Large Shield Door Open/Close operation	None	2006-10 shutdown [10]	2005 Shutdown only [22-2.0]
23	ODH Barrier Wall at Tunnel/Hall Boundary	None	None [10]	Complete [10]
24	Beam Pipe	None	Final beam pipes	4" beam pipe at 2005 shutdown [24-2.0]
25	Gate valves & Vacuum Instrumentation	None	Instrumentation and pumps	Gate valve at low Beta Quad; ACNET vacuum controls and monitoring [25-2.0]
26	B2 Removal equipment	None	coordination interface [10]	to be installed in 2008 shutdown. [26-2.0]
CONSTRUCTION ITEM REQUIREMENTS				
27	ODH Requirement in Halls [2,9]	Accelerator Division SSO	Accelerator Division SSO	Accelerator Division SSO
28	Radiation Training requirement in Halls [2, 9]	Accelerator Division SSO	Accelerator Division SSO	Accelerator Division SSO
29	Excavation through the Berm [3, 9]	Accelerator Division SSO	Accelerator Division SSO	Accelerator Division SSO

(Explanation of Requirement Sources)	ACTION Needed
1) BTeV Electrical & Electronics Infrastructure at CO section of the TDR. By John Anderson, Ed Barsotti, Linda Bagby et. Al.	Need to be revised/updated
2) Various Meetings/Emails (Undocumented)	Need Documented?
3) Review Comments from Jan-Feb 04 Lab Wide Review of WBS 3.0 Document	
4) Heat Load List (located in Database Document, latest date=_____	
5) Bldg Calc, Codes & Guidelines	
6) Email from R. Sanders to J. Howell Feb 13 2004 on Continuous Air Make up Reqmnt for Collision and Assembly Hall	Need Documented formally?
7) Email from R. Sanders to J. Howell Jan 06, 2004 on ODH cfm requirement, including ODH calculation attachment	Need Documented formally?
8) CO service bldg meeting (Follow Emails??)	Need Documented?
9) AD SSO	
10) Meeting Sep 16 2004 between WBS 1.1, 2.0, & 3.0	
6-2.0) Integration meeting notes from 3/12/04	
14-2.0) Integration meeting notes from 3/12/04	Requires further discussion on LCW requirements and specifications
22-2.0) general agreement	
23-2.0) Integration meeting notes from 3/12/04	
24-2.0) Integration meeting notes from 3/12/04	
25-2.0) Integration meeting notes from 3/12/04	Requires further discussion of instrumentation details.
26-2.0) Integration meeting notes from 3/12/04	

NEPA PIF

Project/Activity Title BTeV Conventional Construction

Project Number 8-6-3

Project Initiator Joel Butler X3148

D/S Initiating Activity PARTICLE PHYSICS DIVISION OFFICE

Type Funding GPP/AIP

Total Estimated Cost 6600000

JUSTIFICATION FOR THE PROJECT

Describe the **purpose and/or need** for the project.

This project would supply infrastructure and utilities necessary to utilize the C-0 Test Area Building, completed in 1998 (Project # 8-6-2), for planned high energy physics experiments.

What are the reasonable alternatives to this project and why were they rejected? (Reasonable alternatives include the following: utilization of a different approach, process, or methodology; conducting the activity at an alternative location; or doing nothing. If inaction would prevent the fulfillment of a purpose and/or need then state this and explain.

There are no feasible alternatives to the proposed project that would accomplish the purpose and need.

DESCRIPTION OF THE PROPOSED ACTION

Provide a **narrative description** of the activity/project. The description shall focus only on physical actions to be undertaken, such as digging, trenching, demolishing, building, etc. **Theoretical or engineering explanations ARE NOT RELEVANT to this analysis.** The type (s) of equipment to be used shall be included where applicable. Indicate the estimated schedule of the action. If this is new construction, *show the location of the project on an attached site map and provide a specific area map showing the limits of the project.*

This project would involve the construction of utility corridors and pads, parking lots, hardstands and two small support structures. Utilities would be trenched in from the Main Ring Road to new 1500 KVA transformers at the B-4, C-0, and C-1 service buildings. A ~700 foot long 13.8 KV feeder, including a manhole, would be run from the B-4 service building to the C-0 Test Area Building. A new 13.8 KVA feeder would be pulled through existing ducts from the Kautz Road substation to the Main Ring Road utilities. Three transformers, an emergency generator, two chillers and two condensers would be placed on new pads in the vicinity of the C-0 Test Area Building. A small gas shed and a service building would be constructed on shallow footers. New hardstand would be constructed to accommodate the support buildings and staging areas. The existing maintenance road would be extended ~200 ft. to intersect E Road, and the existing hardstand parking lot and service drive would be paved.

Describe the **magnitude of the project**. Provide as much quantitative information as possible

relevant to the overall impact of the project on the environment. (For example, what is the area of a new building, length of utility lines to be installed, the volume of soil to be excavated, volume and character of effluent(s), magnitude of radioactivity, etc.)

All excavation would be minor in nature. Shallow footers would require <100 cu. yd. of excess spoil. Excavations for the feeder lines will generate little or no spoils, because soil will be used for backfilling. Any excess suitable soils would be taken to a stockpile on site. Non-suitable materials would be taken off site for disposal. The area of the gas shed would be ~150 sq. ft., and the new service building ~750 sq. ft. The extension of the maintenance road would require ~1200 sq. ft. of new paving. New hardstands would be ~6000 sq. ft.

POTENTIAL ENVIRONMENTAL EFFECTS

Please check items that apply. **Include a detailed explanation of all items checked.**

Will the proposed action change or cause disturbance to the following resources?

Will the proposed action involve any of the following regulated substances or activities?

- Clearing or Excavation (The following information will also be needed on the PIF: the estimated area to be affected, the volume of spoils, the expected disposition of spoils, and the soil erosion control measures to be utilized.)
- Chemical use or storage (If the action involves excavation, determine whether the location was ever used for chemical dispensing, was a waste or product storage area, or has been the site of any chemical spills. Also, find out if the proposed location is near one of Fermilab's 5 RCRA Solid Waste Management Units.)
- Radiation exposures or radioactive air emissions

Other relevant disclosures

Comments

Excavation -- see magnitude section above.

Chemical Storage -- standard gases (nitrogen, helium, ethane/argon) would be stored in the gas shed. None of the gases are flammable.

Radiation exposure -- a portion of the work would be accomplished in a controlled area. All workers in this area will be required to have had Rad Worker training. No radioactive air emissions are anticipated.

DEC 23 2003

FAO
Cooper/mb

12/23/03

FAO
Lutha

12/ /03

FAO
Miller

12/ 23 /03

FAO
Monhart

12/ 23 /03

Mr. Gerald Brown, Associate
Director for Operations Support
Fermilab
P.O. Box 500
Batavia, IL 60510

Dear Mr. Brown:

SUBJECT: NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) DETERMINATION AT
FERMI NATIONAL ACCELERATOR LABORATORY - "BTev PROJECT"

Reference: Letter, G. Brown to J. Monhart, dated December 12, 2003, Subject: Same As
Above

I have reviewed the Fermilab Environmental Evaluation Notification Form (EENF) for the
subject proposed project transmitted by your referenced letter. Based on the information
provided in the EENF, I have approved the following project as a categorical exclusion (CX):

<u>Project Name</u>	<u>Approved</u>	<u>CX (s)</u>
BTev Project	12/23/2003	B1.15, B3.10

I am returning a signed copy of the EENF for your records. No further NEPA review is
required. This project falls under a categorical exclusion(s) provided in 10 CFR 1021, as
amended in 1996.

Sincerely,
Original signed by
Jane L. Monhart
Area Manager

Jane L. Monhart
Area Manager

Enclosure:
Signed EENF

cc: M. Witherell, w/o encl.
K. Stanfield, w/o encl.
B. Chrisman, w/o encl.
C. Trimby, w/o encl.
cc: J. Butler, PPD, w/encl.
B. Griffing, ESHS, w/encl.
T. Dykhuis, ESHS, w/o encl.
bc: P. Siebach, TS-STs, w/encl.
V. Prouty, OCC-GL, w/o encl.

S:CX-BTev.12-03.jc

File: ENV-7

FERMILAB ENVIRONMENTAL EVALUATION NOTIFICATION FORM

Project/Activity Title: BTeV Project

ES&H Tracking Number: 01038

Funding Source: Major Item of Equipment

Fermilab Project Manager: Joel Butler

Signature

Joel Butler

Date

Dec. 12, 2003

Fermilab NEPA Reviewer: Teri Dykhuis

Signature

Teri L. Dykhuis

Date

12/12/03

I. Description of the Proposed Action

The proposed BTeV Project would include building and installing a new detector in the C-Zero Hall of the Tevatron Collider. The BTeV project would consist of three subprojects: the BTeV Detector, Interaction Region, and the C-Zero Outfitting.

The BTeV Detector would consist of a large analysis dipole magnet; a silicon pixel vertex detector; a forward tracker consisting of silicon microstrip detectors close to the beams and straw tube chambers far from the beam; a Ring Imaging Cherenkov counter (RICH) for particle identification; an electromagnetic calorimeter to reconstruct photons and measure their momenta and angles; and a muon detector. The BTeV Detector would also include a state of the art trigger system that can analyze every beam crossing of the Tevatron and select events with evidence of particles containing *b*-quarks that decay downstream of the main interaction vertex and a high speed high capacity data acquisition system capable of recording all events containing these *b*-quarks.

The Interaction Region subproject will modify the accelerator to produce high luminosity at the C-Zero interaction region.

The C-Zero Outfitting subproject would supply infrastructure and utilities necessary to utilize the C-0 Test Area Building, which was completed in 1998 (Project # 8-6-2), for planned high energy physics experiments.

This subproject would involve the construction of utility corridors and pads, parking lots, hardstands and two small support structures. Utilities would be trenched in from the Main Ring Road to new 1500 KVA transformers at the B-4, C-Zero, and C-One service buildings. An approximate 700 feet long 13.8 KV feeder, including a manhole, would be run from the B-Four service building to the C-Zero Test Area Building. A new 13.8 KVA feeder would be pulled through existing ducts from the Kautz Road substation to the Main Ring Road utilities. Three transformers, an emergency generator, two chillers and two condensers would be placed on new pads in the vicinity of the C-Zero Test Area Building. A small gas shed and a service building would be constructed on shallow footers. New hardstand would be constructed to accommodate the support buildings and staging areas. The existing maintenance road would be extended approximately 200 feet to intersect E Road, and the existing hardstand parking lot and service drive would be paved. In addition, internal modifications would be made to the C-Zero Test Area Building to accommodate the BTeV experiment.

There are no feasible alternatives to the proposed project that would accomplish the purpose and need.

II. Description of the Affected Environment

All excavation would be minor in nature. Shallow footers would require less than 100 cubic yards of excess spoil. Excavations for the feeder lines will generate little or no spoils, because soil will be used for backfilling. Any excess suitable soils would be taken to a stockpile on site. Non-suitable materials would be taken off site for disposal. The area of the gas shed would be approximately 150 square feet, and the new service building would be approximately 750 square feet. The extension of the maintenance road would require approximately 1200 square feet of new paving. New hardstands would be approximately 6000 square feet.

III. Potential Environmental Effects (Provide comments for each checked item and where clarification is necessary.)

- A. Sensitive Resources: Will the proposed action result in changes and/or disturbances to any of the following resources?

- ☐ Threatened or endangered species
- ☐ Other protected species
- ☐ Wetland/Floodplains
- ☐ Archaeological or historical resources
- ☐ Non-attainment areas

- B. Regulated Substances/Activities: Will the proposed action involve any of the following regulated substances or activities?

- ☒ Clearing or Excavation
- ☐ Demolition or decommissioning
- ☐ Asbestos removal
- ☐ PCBs
- ☐ Chemical use or storage
- ☐ Pesticides
- ☐ Air emissions
- ☐ Liquid effluents
- ☐ Underground storage tanks
- ☐ Hazardous or other regulated waste (including radioactive or mixed)
- ☒ Radioactive exposures or radioactive air emissions
- ☐ Radioactivation of soil or groundwater

- C. Other relevant Disclosures

- ☐ Threatened violation of ES&H permit requirements
- ☐ Siting/construction/major modification of waste recovery or TSD facilities
- ☐ Disturbance of pre-existing contamination
- ☐ New or modified permits
- ☐ Public controversy
- ☐ Action/involvement of another federal agency
- ☐ Public utilities/services
- ☐ Depletion of a non-renewable resource

IV. NEPA Recommendation

Fermilab has reviewed this proposed action and concluded that the appropriate level of NEPA determination is a Categorical Exclusion. The conclusion is based on the proposed action meeting the applicable requirements in DOE's NEPA Implementation Procedures, 10 CFR 1021, Subpart D, Appendix B3.10 and B1.15.

V. DOE/CH-FAO NEPA Coordinator Review

Concurrence with the recommendation for determination:

NEPA Coordinator reviewer Jonathan P. Cooper

Signature Jonathan P. Cooper

Date 12/23/03

Fermi Area Manager Jane L. Monhart

Signature Jane L. Monhart

Date 12/23/03

VI. Comments on checked items in section III.

Excavation

See description of C-Zero Outfitting above.

Radiation exposure

A portion of the work would be accomplished in a controlled area. All workers in this area would be required to have received Radiation Worker training. No radioactive air emissions are anticipated.



Project Checklist

Project Name: BTeV

Yes ? No

1 1 12 Sustainable Sites 14 Points

Y				Prereq 1	Erosion & Sedimentation Control	Required
X				Credit 1	Site Selection	1
			X	Credit 2	Urban Redevelopment	1
			X	Credit 3	Brownfield Redevelopment	1
			X	Credit 4.1	Alternative Transportation, Public Transportation Access	1
	X			Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
			X	Credit 4.3	Alternative Transportation, Alternative Fuel Vehicles	1
			X	Credit 4.4	Alternative Transportation, Parking Capacity	1
			X	Credit 5.1	Reduced Site Disturbance, Protect or Restore Open Space	1
			X	Credit 5.2	Reduced Site Disturbance, Development Footprint	1
			X	Credit 6.1	Stormwater Management, Rate and Quantity	1
			X	Credit 6.2	Stormwater Management, Treatment	1
			X	Credit 7.1	Landscape & Exterior Design to Reduce Heat Islands, Non-Roof	1
			X	Credit 7.2	Landscape & Exterior Design to Reduce Heat Islands, Roof	1
			X	Credit 8	Light Pollution Reduction	1

Yes ? No

3 2 Water Efficiency 5 Points

X				Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
X				Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
			X	Credit 2	Innovative Wastewater Technologies	1
X				Credit 3.1	Water Use Reduction, 20% Reduction	1
			X	Credit 3.2	Water Use Reduction, 30% Reduction	1

Yes ? No

4 13 Energy & Atmosphere 17 Points

Y				Prereq 1	Fundamental Building Systems Commissioning	Required
Y				Prereq 2	Minimum Energy Performance	Required
Y				Prereq 3	CFC Reduction in HVAC&R Equipment	Required
X				Credit 1	Optimize Energy Performance, 15% New / 5% Existing	1
X					Optimize Energy Performance, 20% New / 10% Existing	1
X					Optimize Energy Performance, 25% New / 15% Existing	1
			X		Optimize Energy Performance, 30% New / 20% Existing	1
			X		Optimize Energy Performance, 35% New / 25% Existing	1
			X		Optimize Energy Performance, 40% New / 30% Existing	1
			X		Optimize Energy Performance, 45% New / 35% Existing	1
			X		Optimize Energy Performance, 50% New / 40% Existing	1
			X		Optimize Energy Performance, 55% New / 45% Existing	1
			X		Optimize Energy Performance, 60% New / 50% Existing	1
			X	Credit 2.1	Renewable Energy, 5%	1
			X	Credit 2.2	Renewable Energy, 10%	1
			X	Credit 2.3	Renewable Energy, 20%	1

		X
		X
X		
		X

Credit 3	Additional Commissioning	1
Credit 4	Ozone Depletion	1
Credit 5	Measurement & Verification	1
Credit 6	Green Power	1

Yes ? No

7		6
---	--	---

Materials & Resources

13 Points

Y		
X		
X		
		X
X		
		X
X		
		X
X		
X		
		X
		X
		X

Prereq 1	Storage & Collection of Recyclables	Required
Credit 1.1	Building Reuse, Maintain 75% of Existing Shell	1
Credit 1.2	Building Reuse, Maintain 100% of Shell	1
Credit 1.3	Building Reuse, Maintain 100% Shell & 50% Non-Shell	1
Credit 2.1	Construction Waste Management, Divert 50%	1
Credit 2.2	Construction Waste Management, Divert 75%	1
Credit 3.1	Resource Reuse, Specify 5%	1
Credit 3.2	Resource Reuse, Specify 10%	1
Credit 4.1	Recycled Content, Specify 5% (p.c. + 1/2 p.i.)	1
Credit 4.2	Recycled Content, Specify 10% (p.c. + 1/2 p.i.)	1
Credit 5.1	Local/Regional Materials, 20% Manufactured Locally	1
Credit 5.2	Local/Regional Materials, of 20% Above, 50% Harvested Locally	1
Credit 6	Rapidly Renewable Materials	1
Credit 7	Certified Wood	1

Yes ? No

8	1	6
---	---	---

Indoor Environmental Quality

15 Points

Y		
Y		
		X
X		
X		
X		
X		
X		
	X	
X		
		X
X		
X		
		X
		X
		X
		X

Prereq 1	Minimum IAQ Performance	Required
Prereq 2	Environmental Tobacco Smoke (ETS) Control	Required
Credit 1	Carbon Dioxide (CO₂) Monitoring	1
Credit 2	Ventilation Effectiveness	1
Credit 3.1	Construction IAQ Management Plan, During Construction	1
Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
Credit 4.2	Low-Emitting Materials, Paints	1
Credit 4.3	Low-Emitting Materials, Carpet	1
Credit 4.4	Low-Emitting Materials, Composite Wood	1
Credit 5	Indoor Chemical & Pollutant Source Control	1
Credit 6.1	Controllability of Systems, Perimeter	1
Credit 6.2	Controllability of Systems, Non-Perimeter	1
Credit 7.1	Thermal Comfort, Comply with ASHRAE 55-1992	1
Credit 7.2	Thermal Comfort, Permanent Monitoring System	1
Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
Credit 8.2	Daylight & Views, Views for 90% of Spaces	1

Yes ? No

		5
--	--	---

Innovation & Design Process

5 Points

		X
		X
		X
		X
		X

Credit 1.1	Innovation in Design: Specific Title	1
Credit 1.2	Innovation in Design: Specific Title	1
Credit 1.3	Innovation in Design: Specific Title	1
Credit 1.4	Innovation in Design: Specific Title	1
Credit 2	LEED™ Accredited Professional	1

Yes ? No

23	2	44
----	---	----

Project Totals

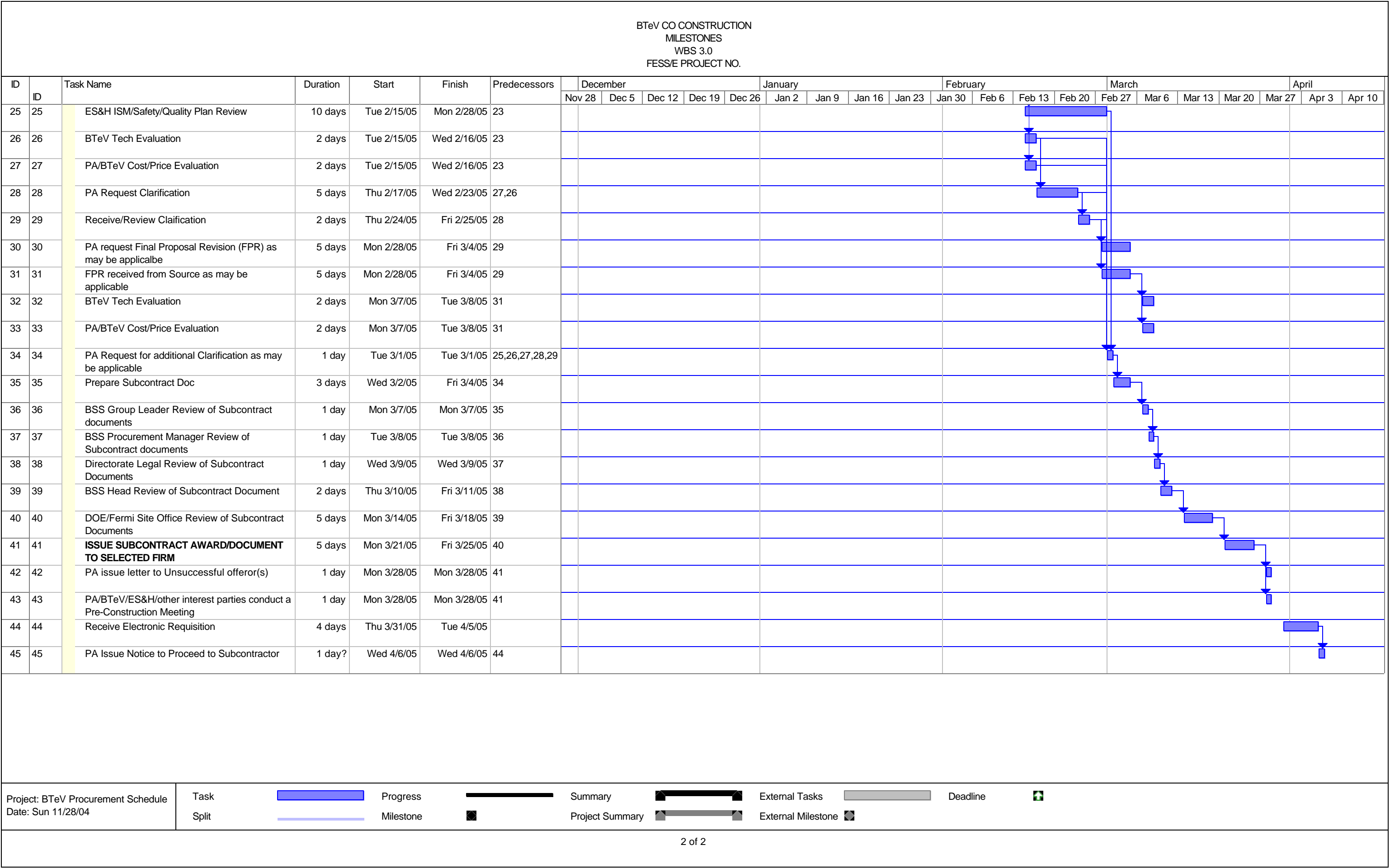
Potential of 69 Points

Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points

<p>BT&V CO CONSTRUCTION</p> <p>MILESTONES</p> <p>WBS 3.0</p> <p>FESS/E PROJECT NO.</p>
--

ID	ID	Task Name	Duration	Start	Finish	Predecessors	December				January				February				March				April			
							Nov 28	Dec 5	Dec 12	Dec 19	Dec 26	Jan 2	Jan 9	Jan 16	Jan 23	Jan 30	Feb 6	Feb 13	Feb 20	Feb 27	Mar 6	Mar 13	Mar 20	Mar 27	Apr 3	Apr 10
		Milestone: No	76 days	Mon 12/20/04	Wed 4/6/05																					
1	1	Create Milestone Table for this Acquisition	1 day	Mon 12/20/04	Mon 12/20/04																					
2	2	Receive paper Blue Dot Requisition and assign to Procurmeent Administrator (PA)	1 day	Tue 12/21/04	Tue 12/21/04	1																				
3	3	Received Statement of Work (SOW)/Exhibit A/attachments/drawings	1 day	Tue 12/21/04	Tue 12/21/04	1																				
4	4	Submit Request for Davis Bacon Wage Determination to DOE	1 day	Tue 12/21/04	Tue 12/21/04	1																				
5	5	Receive the Approved Davis Bacon Wage Determination from DOE	3 days	Tue 12/21/04	Thu 12/23/04	1																				
6	6	Review FLs Terms & Conditions/Addendum/Drawings/etc.	14 days	Tue 12/21/04	Tue 1/11/05	1																				
7	7	PA Prepares RFP documents	14 days	Tue 12/21/04	Tue 1/11/05	1																				
8	8	PA/ Project Establishs Evaluation Criteria for selection & Award	14 days	Tue 12/21/04	Tue 1/11/05	1																				
9	9	BSS Group Leader Review of RFP	1 day	Wed 1/12/05	Wed 1/12/05	6,7,8																				
10	10	BSS Procurement Manager Review of RFP	1 day	Wed 1/12/05	Wed 1/12/05	6,7,8																				
11	11	BTeV Project Manager/Requestor Review of RFP	1 day	Thu 1/13/05	Thu 1/13/05	10																				
12	12	Directorate Legal Review of RFP	1 day	Fri 1/14/05	Fri 1/14/05	11																				
13	13	ISSUE RFP	20 days	Mon 1/17/05	Fri 2/11/05	12																				
14	14	Fax Notice of RFP Mailing to Source List Firms for their information/planning	1 day	Mon 1/17/05	Mon 1/17/05	13SS																				
15	15	Offer to Acknowledge intent to attend pre-proposal conference	3 days	Mon 1/17/05	Wed 1/19/05	13SS																				
16	16	Offer to submit questions for pre-proposal conference	3 days	Mon 1/17/05	Wed 1/19/05	13SS																				
17	17	PA respond to written questions	2 days	Thu 1/20/05	Fri 1/21/05	16																				
18	18	Pre-proposal Conference at Fermilab	1 day	Mon 1/24/05	Mon 1/24/05	17																				
19	19	BTeV Project Team conduct Site Visit as may be applicable	1 day	Mon 1/24/05	Mon 1/24/05	17																				
20	20	PA to respond to pre-proposal/site visit questions/issues	1 day	Mon 1/24/05	Mon 1/24/05	17																				
21	21	Prepare and distribute Amendment to RFP as may be necessary following conference/site	2 days	Mon 1/24/05	Tue 1/25/05	17																				
22	22	Firm/Source to acknowledge intent to offer on RFP	3 days	Wed 1/26/05	Fri 1/28/05	21																				
23	23	RFP CLOSES (extend time as may be necessary, i.e., Amendments)	1 day	Mon 2/14/05	Mon 2/14/05	13																				
24	24	FL-55 Request/approva (applicable >\$500 for other than Construction / >\$1 mil for	5 days	Tue 2/15/05	Mon 2/21/05	23																				

Project: BTeV Procurement Schedule Date: Sun 11/28/04	Task		Progress		Summary		External Tasks		Deadline	
	Split		Milestone		Project Summary		External Milestone			



2. Building M&R Cost Profiles

This chapter presents estimates of 50-year maintenance cost profiles for 50 building models. Each two-page profile includes a description of the model building, a list of major components, and forecasts of maintenance and repair (M&R) costs at various levels of aggregation. The profile estimates were made with the Whitestone MARS forecast system, calibrated for the Washington DC metropolitan area. The profiles can be adjusted for other metro areas using the Local Maintenance Cost Index shown in Chapter 3, and modified to include different components shown in Chapter 5.

Table 2-1
Summary of M&R Cost Profiles

Building Type	Gross Sqft.	Annual M&R Cost per Gsft.*	Annual M&R Cost as % of Repl. Value
Car Wash	800	\$10.00	4.90%
Garage, Service Station	1,400	7.36	6.40
Apartments 1-3 story	22,500	6.53	6.64
Apartments 4-7 story	60,000	6.27	6.27
Motel	8,000	6.06	6.58
Fire Station	6,000	5.61	5.66
Restaurant, Fast Food	4,000	5.53	4.91
Bank	4,100	5.43	3.56
Telephone Exchange	5,000	5.12	4.92
Motel, 40 Unit	18,000	5.03	4.86
Laundromat	3,000	5.03	4.36
Restaurant, Large	10,000	4.99	4.17
Club, Country	6,000	4.81	3.69
Religious Education	10,000	4.77	4.53
Warehouse, Self-storage	24,000	4.45	7.18
Medical Clinic	13,000	4.17	2.51
Movie Theater	10,000	4.12	3.96
Store, Convenience	4,000	4.10	5.77
Community Center	10,000	4.09	4.34
Hospital, General	125,000	4.08	3.37
Hospital, Research	540,200	4.05	1.53
Dormitory, 50 Room	25,000	4.04	4.93
Bus Terminal	12,000	3.82	4.21
Store, Retail	8,000	3.80	5.14
Funeral Home	10,000	3.76	4.43
Town Hall, 1 Story	11,000	3.66	4.26
Church	17,000	3.60	3.20
Court House 1 Story	30,000	3.52	2.74
Post Office	13,000	3.51	4.28
Auditorium	24,000	3.48	3.34
Public Library, 3 Story	60,000	3.40	3.26
College Student Union	25,000	3.35	3.32
Apartments, 24 Story	220,000	3.17	4.11
Club, Social	22,000	3.15	3.41
Gymnasium	40,000	3.07	3.39
Hockey Rink	30,000	2.94	2.77
College Classroom	90,000	2.89	2.84
Elementary School	47,000	2.81	4.06
Childcare Center	12,000	2.71	2.43
Bowling Center	20,000	2.59	4.13
Garage, Auto Sales	21,000	2.56	3.78
County Jail	318,455	2.46	0.65
Light Manufacturing Plant	45,000	2.37	4.19
Office Park	65,000	2.27	4.92
Supermarket	96,000	2.20	3.25
Department Store	94,000	2.15	3.28
Office Building, 2 Story	83,000	2.04	2.29
Office Building, 15 Story	250,000	1.90	1.65
Aircraft Hangar	32,000	1.86	2.45
Warehouse, Large	80,000	1.80	4.02

*Average costs over 50-year lifetime, Washington DC metro area

From the cost analysts perspective, the most useful information in these profiles is probably the year-by-year total shown under the "Cost per Sqft. by System" section. A projection of M&R costs is required in the financial evaluation of virtually all large construction or renovation projects. Often this trend is estimated with a simple approximation (2 to 4 percent of replacement value is common) that obscures the actual oscillations in M&R requirements, and misstates costs when expressed in terms of present value. In comparison, Whitestone estimates are based on component life cycles that provide a more realistic and defensible projection of M&R costs.

For the purposes of the facility manager, average values for M&R costs may be more useful than detailed year-to-year estimates. Conversations about facility funding and budgeting usually dwell on average costs per square foot, or average costs as a percentage of replacement value. Among our building models, the highest average cost per gsft. was for the car wash (\$10.00), while the warehouse model had the lowest average cost (\$1.80).

The reader may note the rankings in order of cost are different when expressed in terms of replacement value. The highest average M&R cost from this perspective was for the self-storage warehouse—7.18 percent of replacement value—a result due primarily to a low estimated replacement cost of \$62 per square foot. A complete list of replacement costs is shown in the Appendix. In general, we are wary of costs expressed in terms of replacement values because of the great variation in new construction costs and the difficulty of determining replacement costs for older buildings.

Profile estimates are sensitive to a variety of factors such as unscheduled maintenance rates, in-house shop rates, and types of utilization. These sensitivities are discussed in Chapter 6, Definitions and Methods.

Community Center

Gross Sqft:	10,000
Height ft.:	12
Exterior:	Brick Veneer
Floor Coverings:	Carpet/Vinyl Tile
HVAC:	Electric Cool, Gas Heat, Singlezone Unit
Occupancy:	600
Replacement Cost:	\$942,102

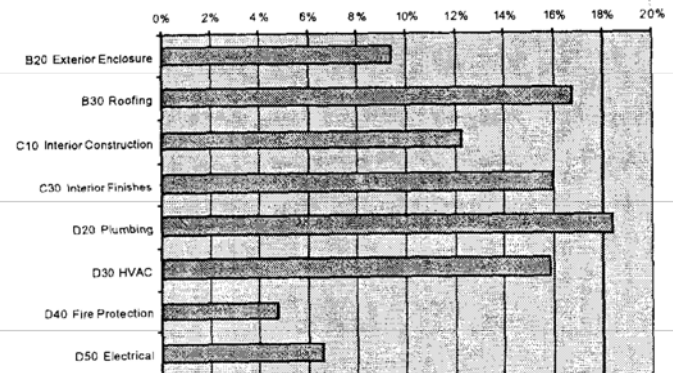
Components

Uniformat / Component	Quantity	Units
B20 Exterior Enclosure		
Clay Brick, Exterior, 1st Floor	4349	Sq Ft
Steel Frame, Painted, Operable Window, 12 sf, 1st Floor	3	Each
Aluminum Frame, Fully Glazed, Exterior Door	4	Each
B30 Roofing		
Concrete Steps	100	Sq Ft
Concrete Decking	400	Sq Ft
Built-up Roof	10000	Sq Ft
C10 Interior Construction		
Steel, Painted, Interior Door	72	Each
C30 Interior Finishes		
Sheetrock, Stippled, Interior Wall Finish	17160	Sq Ft
Vinyl Tile Flooring	5000	Sq Ft
Carpet, Nylon 20 oz., High Traffic	5000	Sq Ft
Acoustical Tile Ceiling	10000	Sq Ft
D20 Plumbing		
Tankless Water Closet	6	Each
Urinal, Vitreous China	2	Each
Lavatory, Vitreous China	7	Each
Sink, Stainless Steel	4	Each
Drinking Fountain, Refrigerated	3	Each
Pipe & Fittings, 3/4" Copper, Cold Water	0.79	K Ln Ft
Pipe & Fittings, 4" Steel	0.9	K Ln Ft
Pipe & Fittings, 2" Copper, Cold Water	0.835	K Ln Ft
Pipe & Fittings, 3/4" Copper, Hot Water	0.35	K Ln Ft
Pipe Insulation, Cold Water	1.24	K Ln Ft
Pipe Insulation, Hot Water	0.6	K Ln Ft
Water Heater, Gas/Oil 175 Gph	2	Each
Pipe & Fittings, 6" Cast Iron	0.43	K Ln Ft
Pipe & Fittings, 10" Cast Iron	0.2	K Ln Ft
Pipe & Fittings, 4" DWV PVC	0.145	K Ln Ft
Roof Drain, 2"	4	Each
Aluminum Gutter, Downspouts, Fittings	0.453	K Ln Ft
D30 HVAC		
Exhaust Fan, Ceiling, 200-500 Cfm	4	Each
Air Conditioner, Rooftop, 50 Ton	1	Each
D40 Fire Protection		
Fire Sprinkler System	1	Each
Fire Sprinkler Head	71	Each
D50 Electrical		
Safety Switch, Fused, 400 Amp., 3 Ph.	1	Each
Main Switchgear, <1200 Amp.	1	Each
Distribution Panel Board	2	Each
Emergency Horn & Siren	5	Each
Exit Lighting Fixture, w/ Battery	4	Each
Incandescent Lighting Fixture, Basic, 100w	60	Each
Fluorescent Lighting Fixture, 160w	60	Each
Wiring Device, Switch	30	Each
Receptacle, 120V, 15 Amp	25	Each
TV Cable Outlet	1	Each
Annunciation Panel	1	Each
Fire Alarm Bell, 6"	4	Each
Fire Alarm Control Panel	1	Each
Manual Pull Station	4	Each
Smoke Detector	6	Each

50-Year M&R Cost Summary

Cost (\$2002)	50 Year Total	Annual Cost per Sqft.	Annual Cost as % Repl. Cost
PM & Minor Repair	\$395,039	\$0.79	0.84%
Unscheduled Maintenance	\$454,055	\$0.91	0.96%
Renewal & Replacement	<u>\$1,193,972</u>	<u>\$2.39</u>	<u>2.53%</u>
Total M&R Costs	\$2,043,066	\$4.09	4.34%

Distribution of Repair Costs



Most Costly Repair Tasks

Major Repair Task	Task Cost*	Pct.**
Replace Air Conditioner, Rooftop, 50 Ton	15.22	9.6%
Refinish Sheetrock, Stippled, Interior Wall Finish	13.76	8.7%
Replace Carpet, Nylon 20 oz., High Traffic	13.47	8.5%
Maintain Built-up Roof	13.23	8.3%
Repair Air Conditioner, Rooftop, 50 Ton	9.33	5.9%
Replace Steel, Painted, Door Locks	8.82	5.6%
Fire Sprinkler System, Annual PM	7.64	4.8%
Clean & Reseal Clay Brick, Exterior, 1st Floor	5.88	3.7%
Replace Pipe & Fittings, 2" Copper, Cold Water	5.72	3.6%
Maintain Steel, Painted, Door Locks	5.49	3.5%
Replace Water Heater, Gas/Oil 175 Gph	4.68	2.9%
Replace Pipe & Fittings, 3/4" Copper, Cold Water	4.20	2.6%
Maintain Air Conditioner, Rooftop, 50 Ton	3.97	2.5%
Repoint (50% surface) Clay Brick, Exterior, 1st Floor	3.49	2.2%
Remove & Replace Membrane, Built-up Roof	3.33	2.1%
Place New Membrane Over Existing, Built-up Roof	3.31	2.1%
Replace Drinking Fountain, Refrigerated	2.27	1.4%
Replace Vinyl Tile Flooring	1.97	1.2%
Replace Pipe & Fittings, 3/4" Copper, Hot Water	1.86	1.2%
Clean Water Heater, Gas/Oil 175 Gph	1.72	1.1%
Minor Repair, Acoustic Tile Ceiling	1.60	1.0%
Replace Ballast & Lamps, Fluorescent Lighting Fixture, 160w	1.45	0.9%
Refinish Steel, Painted, Interior Door	1.42	0.9%
Replace Fluorescent Lighting Fixture, 160w	1.27	0.8%
Minor Repair, Sheetrock, Stippled, Interior Wall Finish	.95	0.6%
Replace Incandescent Lighting Fixture, Basic, 100w	.86	0.5%
Annual PM, Distribution Panel Board	.85	0.5%
Non-Destructive Moisture Inspection	.84	0.5%
Replace Pipe Insulation, Cold Water	.77	0.5%
Repair Clay Brick, Exterior, 1st Floor	.77	0.5%

***Use This Profile as a Template.** Adjust for other areas with the local cost index in Chapter 3. Substitute other components using the component data in Chapter 5.

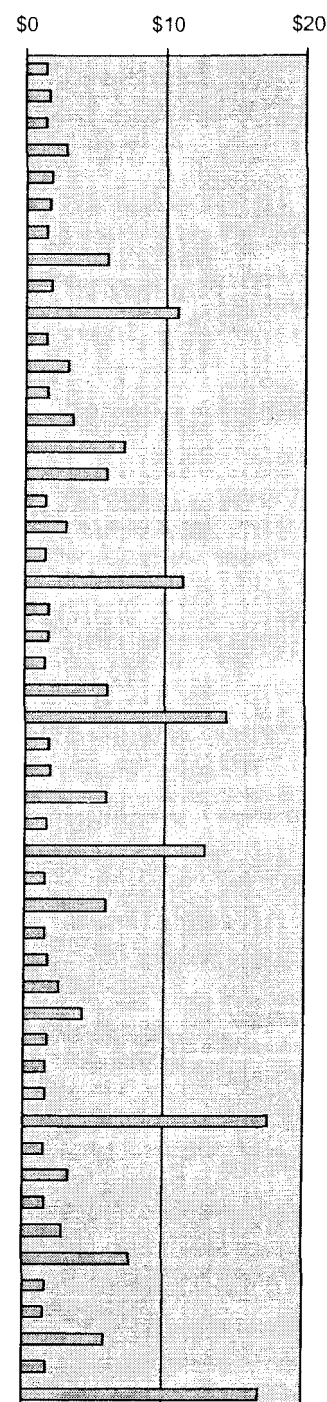
*Task cost (\$2002) per gross square foot over 50 years.

**Percent of total M&R costs.

Cost per Sqft. by System

Building Age	Exterior Closure	Roofing	Interior Construction	Stairways	Interior Finish	Conveying Systems	Plumbing Systems	HVAC Systems	Fire Protection	Electrical Systems	Equipment	Total per Sqft.
1	.02	.53	.30				.19	.16	.16	.10		1.45
2	.02	.53	.30		.01		.39	.16	.16	.10		1.66
3	.02	.58	.30				.19	.16	.16	.10		1.50
4	.02	.53	.41		1.16		.39	.16	.16	.10		2.93
5	.02	.53	.30				.30	.16	.22	.32		1.84
6	.02	.58	.30		.01		.39	.16	.16	.10		1.71
7	.02	.61	.30				.20	.16	.16	.10		1.54
8	.02	.53	.41		3.39		1.08	.16	.16	.11		5.86
9	.02	.58	.30		.34		.19	.16	.16	.10		1.84
10	2.79	.53	2.06		.01		.89	3.27	.42	.91		10.89
11	.02	.53	.30				.19	.16	.16	.10		1.45
12	.09	.58	.41		1.16		.39	.16	.16	.10		3.06
13	.02	.53	.30				.38	.16	.16	.10		1.64
14	.02	2.26	.30		.01		.40	.16	.16	.10		3.41
15	.02	.58	.30				.21	5.09	.22	.69		7.11
16	.02	.53	.41		3.39		1.08	.16	.16	.11		5.86
17	.02	.53	.30				.19	.16	.16	.10		1.45
18	.02	.58	.30		1.32		.39	.16	.16	.10		3.02
19	.02	.53	.30				.19	.16	.16	.10		1.45
20	2.79	.78	2.18		1.90		1.28	.31	.39	1.73		11.37
21	.02	.66	.30				.29	.16	.16	.10		1.68
22	.02	.53	.30		.01		.39	.16	.16	.10		1.66
23	.02	.53	.30				.19	.16	.16	.10		1.45
24	.09	.58	.41		3.39		1.08	.16	.16	.11		5.99
25	2.15	.53	.30				7.28	3.27	.22	.62		14.36
26	.02	.53	.30		.01		.47	.16	.16	.10		1.75
27	.02	.58	.30		.34		.20	.16	.16	.10		1.85
28	.02	3.41	.41		1.16		.39	.16	.16	.10		5.82
29	.02	.53	.30				.28	.16	.16	.10		1.55
30	2.79	.53	2.06		.01		.88	5.09	.42	1.18		12.96
31	.02	.58	.30				.20	.16	.16	.10		1.51
32	.02	.53	.41		3.39		1.07	.16	.16	.10		5.84
33	.02	.53	.30				.20	.16	.16	.11		1.46
34	.02	.58	.30		.01		.37	.16	.16	.10		1.70
35	.02	.61	.30				.84	.16	.22	.32		2.47
36	.09	.53	.41		2.47		.30	.16	.16	.10		4.22
37	.02	.58	.30				.36	.16	.16	.10		1.67
38	.02	.53	.30		.01		.31	.16	.16	.10		1.58
39	.02	.53	.30				.38	.16	.16	.10		1.64
40	2.79	.83	2.18		4.13		1.94	3.42	.39	1.83		17.53
41	.02	.53	.30				.28	.16	.16	.11		1.54
42	.02	2.26	.30		.01		.31	.16	.16	.10		3.32
43	.02	.58	.30				.28	.16	.16	.10		1.59
44	.02	.53	.41		1.16		.30	.16	.16	.10		2.84
45	.02	.53	.30		.34		.51	5.09	.22	.69		7.70
46	.02	.58	.30		.01		.30	.16	.16	.10		1.63
47	.02	.53	.30				.28	.16	.16	.10		1.54
48	.09	.53	.41		3.39		.99	.16	.16	.10		5.84
49	.02	.66	.30				.29	.16	.16	.11		1.68
50	4.92	.53	2.06		.01		7.80	.16	.42	1.00		16.90
Total	19.24	34.33	25.05		32.60		37.63	32.39	9.61	13.45		204.31

50 Year Profile, Total Cost per Sqft.



A value of "0.00" means a cost of more than \$.000 but less than \$.005 per gross square foot.

3. Local M&R Costs

The statistics in this chapter focus on local maintenance costs for 210 major U.S. and Canadian metropolitan areas. Three types of measures are presented:

- **Local maintenance cost indexes** measure relative maintenance and repair (M&R) costs across metro areas
- **In-house shop rates** for trades and supervisory positions common to the in-house M&R staff
- **Contract labor rates** for trades common in M&R construction

The local maintenance cost index is based on the M&R costs of a two-story office building (shown in Chapter 2) standardized to the Washington DC area. The range of the index is considerable, as indicated in Table 3.1. Costs in New York, NY are an estimated 54% higher than those in Washington DC for the same building. In the other direction, M&R costs in Columbus, GA are an estimated 35% lower than the Washington DC value. This index can be used for simple comparisons among metro areas, and also used to adjust the cost profiles in Chapter 2 for metro areas other than Washington DC (the original area for which the profiles were estimated).

Table 3-1.
Comparison of M&R Costs by Metro Area

Metro Area	Local Maintenance Cost Index*	Metro Area	Local Maintenance Cost Index*	Metro Area	Local Maintenance Cost Index*	Metro Area	Local Maintenance Cost Index*
New York, NY	153.9	Olympia, WA	101.7	Kalamazoo, MI	88.4	Burlington, VT	76.3
Yonkers, NY	139.5	Tacoma, WA	101.7	Bowling Green, KY	88.3	Fargo, ND	76.3
San Francisco, CA	136.6	Buffalo, NY	101.5	Green Bay, WI	88.3	Rutland, VT	76.1
San Jose, CA	130.2	San Diego, CA	101.5	Springfield, MO	87.9	Waco, TX	75.9
Honolulu, HI	126.5	Milwaukee, WI	101.4	Owensboro, KY	87.5	Norfolk, VA	75.6
Oakland, CA	124.9	Akron, OH	101.3	Concord, NH	87.4	Macon, GA	75.4
Newark, NJ	124.4	Charleston, WV	101.2	Manchester, NH	87.4	Wichita Falls, TX	75.2
Jersey City, NJ	124.4	Worcester, MA	100.8	Cedar Rapids, IA	87.3	Bismarck, ND	75.1
Philadelphia, PA	124.2	Medford, OR	100.7	Pueblo, CO	87.3	Tuscaloosa, AL	74.7
Trenton, NJ	123.9	Indianapolis, IN	100.4	Watertown, NY	87.2	Virginia Beach, VA	73.4
Hilo, HI	123.4	Duluth, MN	100.3	Cleveland, OH	86.2	Newport News, VA	73.2
New Brunswick, NJ	122.5	Washington DC	100.0	Omaha, NE	86.1	Orlando, FL	72.8
Camden, NJ	121.6	Ann Arbor, MI	100.0	Houston, TX	85.7	Grand Rapids, MI	72.8
Atlantic City, NJ	121.6	Fall River, MA	99.9	Memphis, TN	85.3	Amarillo, TX	72.7
Boston, MA	119.8	Scranton, PA	99.7	Portland, ME	85.3	Tampa, FL	72.5
Chicago, IL	117.8	Peoria, IL	99.5	Colorado Springs, CO	85.1	Chattanooga, TN	72.3
Stamford, CT	117.4	Columbus, OH	99.0	Phoenix, AZ	85.0	Tulsa, OK	72.2
Wilmington, DE	111.0	Springfield, MA	99.0	Miami, FL	84.4	Hampton, VA	71.9
Kansas City, MO	110.2	Moline, IL	98.4	Boise, ID	83.8	El Paso, TX	71.6
Los Angeles, CA	109.7	Flint, MI	98.1	Salt Lake City, UT	83.6	Savannah, GA	71.5
Minneapolis, MN	108.8	Dayton, OH	97.7	New Orleans, LA	83.5	Corpus Christi, TX	71.5
Lowell, MA	108.1	Terre Haute, IN	97.7	Marquette, MI	83.1	Boulder, CO	71.5
Norwalk, CT	108.1	Springfield, OH	97.4	Wichita, KS	83.0	Biloxi, MS	71.0
Anaheim, CA	108.1	Cincinnati, OH	97.4	Billings, MT	82.6	Sioux Falls, SD	69.8
Danbury, CT	108.0	Youngstown, OH	97.2	Beaumont, TX	82.6	Cheyenne, WY	69.1
Santa Barbara, CA	108.0	Richland, WA	96.9	Pocatello, ID	82.5	Lubbock, TX	67.3
St. Louis, MO	107.3	Baltimore, MD	96.8	Lewiston, ME	82.3	Columbus, GA	65.4
Fairbanks, AK	106.9	Reading, PA	96.7	Albuquerque, NM	82.1	Rapid City, SD	65.1
Detroit, MI	106.9	Rochester, MN	96.2	Sioux City, IA	82.0	Roanoke, VA	64.5
Oxnard, CA	106.7	Harrisburg, PA	96.1	Austin, TX	82.0	Tallahassee, FL	64.1
Pittsburgh, PA	106.5	Madison, WI	96.1	Altus, OK	81.3	Raleigh-Durham, NC	64.0
Stockton, CA	106.3	Kokomo, IN	96.0	Lawton, OK	81.3	Winston-Salem, NC	63.9
Juneau, AK	106.2	Carson City, NV	95.5	Daytona Beach, FL	81.3	Greensboro, NC	62.9
Sacramento, CA	106.0	Reno, NV	95.5	San Antonio, TX	81.1	Charlotte, NC	62.9
Las Vegas, NV	105.8	Rochester, NY	95.4	Tucson, AZ	81.0	Jackson, MS	62.8
Salem, OR	105.1	Lansing, MI	94.7	Oklahoma City, OK	80.5	Columbia, SC	61.8
Anchorage, AK	105.0	Louisville, KY	94.2	Great Falls, MT	80.2	Charleston, SC	61.7
Rockford, IL	104.9	Muncie, IN	94.1	Nashville, TN	80.0	Beaufort, SC	56.2
Toledo, OH	104.8	Saginaw, MI	94.0	Richmond, VA	79.8		
Portland, OR	104.7	Davenport, IA	93.4	Ogden, UT	79.6		
Riverside, CA	104.7	Erie, PA	93.2	Dallas, TX	79.5		
Eugene, OR	104.6	South Bend, IN	92.9	Birmingham, AL	79.5		
Gary, IN	104.5	Evansville, IN	92.5	Fort Smith, TX	79.1		
Seattle, WA	103.9	Battle Creek, MI	92.3	Fort Worth, TX	78.7		
New Haven, CT	103.3	Albany, NY	92.3	Alamogordo, NM	78.7		
Waterbury, CT	103.2	Denver, CO	91.3	Jacksonville, FL	78.6		
Springfield, IL	103.0	Spokane, WA	90.8	Las Cruces, NM	78.4		
Parkersburg, WV	102.9	Syracuse, NY	90.7	Fort Lauderdale, FL	78.3		
Fresno, CA	102.9	Cumberland, MD	90.1	Shreveport, LA	78.1		
Bakersfield, CA	102.7	Topeka, KS	89.9	Mobile, AL	77.5		
Brockton, MA	102.1	Atlanta, GA	89.8	Lexington, KY	77.3		
Providence, RI	102.1	Des Moines, IA	89.8	Huntsville, AL	77.1		
Hartford, CT	102.0	Utica, NY	89.8	Little Rock, AR	77.1		
Norwich, CT	102.0	Eau Claire, WI	89.3	Knoxville, TN	76.3		
						Canadian Cities	
						Toronto, Ontario	103.4
						Hamilton, Ontario	99.1
						London, Ontario	97.0
						Ottawa, Ontario	95.3
						Vancouver, B.C.	95.0
						Quebec, Quebec	86.3
						Montreal, Quebec	85.2
						Calgary, Alberta	79.2
						Edmonton, Alberta	79.1
						Winnipeg, Manitoba	78.9

*Total average cost, Washington DC=100; Canadian cities are in Canadian dollars.

3.1 Local Maintenance Cost Indexes, Selected Metro Areas

Area	Cost per Sqft.	Local Index	200 Area Ranking	Area	Cost per Sqft.	Local Index	200 Area Ranking
Chicago, IL				Cumberland, MD			
PM & Minor Repair.....	\$.46	129.7	15	PM & Minor Repair.....	\$.32	90.5	112
Unscheduled Maintenance.....	.47	133.9	15	Unscheduled Maintenance.....	.31	89.1	111
Renewal & Replacement.....	1.48	110.4	16	Renewal & Replacement.....	1.21	90.3	100
Total Average Cost.....	2.41	117.8	16	Total Average Cost.....	1.84	90.1	103
Cincinnati, OH				Dallas, TX			
PM & Minor Repair.....	.32	90.5	113	PM & Minor Repair.....	.28	77.9	148
Unscheduled Maintenance.....	.31	89.1	112	Unscheduled Maintenance.....	.26	74.5	148
Renewal & Replacement.....	1.36	101.3	48	Renewal & Replacement.....	1.09	81.3	147
Total Average Cost.....	1.99	97.4	78	Total Average Cost.....	1.63	79.5	149
Cleveland, OH				Danbury, CT			
PM & Minor Repair.....	.33	94.4	98	PM & Minor Repair.....	.38	107.9	45
Unscheduled Maintenance.....	.33	93.4	97	Unscheduled Maintenance.....	.38	109.1	45
Renewal & Replacement.....	1.10	82.1	141	Renewal & Replacement.....	1.45	107.8	21
Total Average Cost.....	1.76	86.2	119	Total Average Cost.....	2.21	108.0	25
Colorado Springs, CO				Davenport, IA			
PM & Minor Repair.....	.32	91.5	110	PM & Minor Repair.....	.34	97.3	89
Unscheduled Maintenance.....	.31	90.1	110	Unscheduled Maintenance.....	.34	96.7	89
Renewal & Replacement.....	1.10	82.1	142	Renewal & Replacement.....	1.23	91.5	95
Total Average Cost.....	1.74	85.1	124	Total Average Cost.....	1.91	93.4	94
Columbia, SC				Dayton, OH			
PM & Minor Repair.....	.17	49.2	198	PM & Minor Repair.....	.33	93.5	103
Unscheduled Maintenance.....	.14	41.5	198	Unscheduled Maintenance.....	.32	92.4	103
Renewal & Replacement.....	.94	70.4	195	Renewal & Replacement.....	1.34	100.1	55
Total Average Cost.....	1.26	61.8	198	Total Average Cost.....	2.00	97.7	75
Columbus, GA				Daytona Beach, FL			
PM & Minor Repair.....	.19	52.6	191	PM & Minor Repair.....	.24	68.9	177
Unscheduled Maintenance.....	.16	45.3	191	Unscheduled Maintenance.....	.22	64.2	177
Renewal & Replacement.....	.99	74.1	182	Renewal & Replacement.....	1.19	89.1	105
Total Average Cost.....	1.34	65.4	189	Total Average Cost.....	1.66	81.3	141
Columbus, OH				Denver, CO			
PM & Minor Repair.....	.32	91.6	108	PM & Minor Repair.....	.35	98.3	85
Unscheduled Maintenance.....	.32	90.3	108	Unscheduled Maintenance.....	.34	97.8	85
Renewal & Replacement.....	1.38	103.2	34	Renewal & Replacement.....	1.18	87.8	114
Total Average Cost.....	2.02	99.0	71	Total Average Cost.....	1.87	91.3	100
Concord, NH				Des Moines, IA			
PM & Minor Repair.....	.30	86.0	126	PM & Minor Repair.....	.33	93.7	102
Unscheduled Maintenance.....	.29	83.6	127	Unscheduled Maintenance.....	.32	92.6	102
Renewal & Replacement.....	1.19	88.8	107	Renewal & Replacement.....	1.18	88.0	113
Total Average Cost.....	1.79	87.4	114	Total Average Cost.....	1.83	89.8	106
Corpus Christi, TX				Detroit, MI			
PM & Minor Repair.....	.22	63.1	184	PM & Minor Repair.....	.41	116.2	26
Unscheduled Maintenance.....	.20	57.6	184	Unscheduled Maintenance.....	.41	118.1	26
Renewal & Replacement.....	1.04	77.4	169	Renewal & Replacement.....	1.36	101.5	46
Total Average Cost.....	1.46	71.5	183	Total Average Cost.....	2.18	106.9	29

Note: Costs per Sqft. are the annual average costs, over a 50 year service life, of maintaining the two-story office building shown in Chapter 2. Local Indexes are standardized (equal 100) for the Washington DC area.



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Russ Wood/Neil DalCerro

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

September 27, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Fire Department comments pertain to sheet FP-2.

Recommend smoke detector over the fire alarm control panel in the main hallway first floor.

Recommend sprinkler protection in the same hallway.

Recommend both stairwells be protected by sprinkler system.

Recommend manual pull stations at exterior doors in the North stairwell.

Confirm a manual pull station is at the exterior door near the loading dock.

Questions regarding these comments may be directed to Captain Neil Dal Cerro

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Teri Dykhuis

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

October 4, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

In addition to the previous submitted comments, please also add the following.
A 250 KVA diesel generator is identified in the 'Detailed Description.' A generator with a rated power output of 1118 kW (1500 hp) or above requires a preconstruction air permit and must be applied for prior to construction of any aspect of generator installation including for example constructing a concrete pad. Consult the FESS Environmental Scientist if a decision is made to acquire a larger generator for this project.

Teri

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Cliff Worby

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

September 30, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

Include arc flash requirements per NFPA70E

RESPONSE

Project Contact Response:

Agree and will incorporate comments

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Teri Dykhuis

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

October 4, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

My comments pertain to the need for inclusion of 'environmental compliance' along with safety compliance in the boiler plate descriptions and for clarification of ES&H responsibilities (ES&H Section personnel versus FESS ES&H personnel), especially as listed in the Responsibility Matrix. My comments are listed by Design Report Section below.

Section V, Subsection ES&H Management, Paragraph One

1. Include environmental compliance by changing the second sentence to the following: "As with all Fermilab projects, attention to ES&H concerns will be part of project management and safety and environmental compliance will be incorporated into all processes."

2. In order to more clearly outline responsibility for environmental and safety aspects during the various phases of the project, the third sentence should be replaced by the following:

RESPONSE

Project Contact Response:

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Jim Elliott

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

September 27, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

No comment

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Bill Shull

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

September 30, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

No comments

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Tony Kanyok

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

September 30, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

No comments

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment:



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

David Baird

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

October 1, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

One comment:

In the section on ESH management, page 18, the line management responsible for ESH is placed on either PPD or AD. However, PPD and AD are not overseeing this project, FESS is overseeing this project. This section is in need of revision and should be consistent with the Construction section on page 22.
Dave

RESPONSE

Project Contact Response:

Comment:

Lab, Project, PPD, and FESS management have agreed that ES&H line management is through the project and PPD to the Directorate. The Project Manager and Construction Manager is also a Level 2 BTeV project manager .



Fermilab

FESS/Engineering

Please ensure that your review included a review of the project for appropriateness of the proposed systems, impacts on existing systems and operations and specific technical requirements to be incorporated into the design

PLEASE ENTER THE FOLLOWING INFORMATION

Reviewer:

Kamran Vaziri

Project Number

6-8-3

UIP ECP (If applicable)

Project Phase:

Comment and Compliance

Comment Date:

October 4, 2004

Print



Duplicate



Main
Menu



COMMENT

Drawing Reference:

START WITH PAGE NUMBER FIRST FOLLOWED BY SECTION OR
DETAIL REFERENCE. Example: A-1, Detail 4

Specification Reference:

PROVIDE SPECIFICATION SECTION AND PARAGRAPH IF APPLICABLE.
Example: 02070 1.5.D.2 (Page 02070-2)

Comment:

The radiological issues, such as scheduling, digging and required training, associated with the construction phase of this project are properly mentioned in the package. I have no additional comments. (K. Vaziri)

RESPONSE

Project Contact Response:

Thank You for Reviewing this Project

Comment: